

# approach

JULY 1978 THE NAVAL AVIATION SAFETY REVIEW

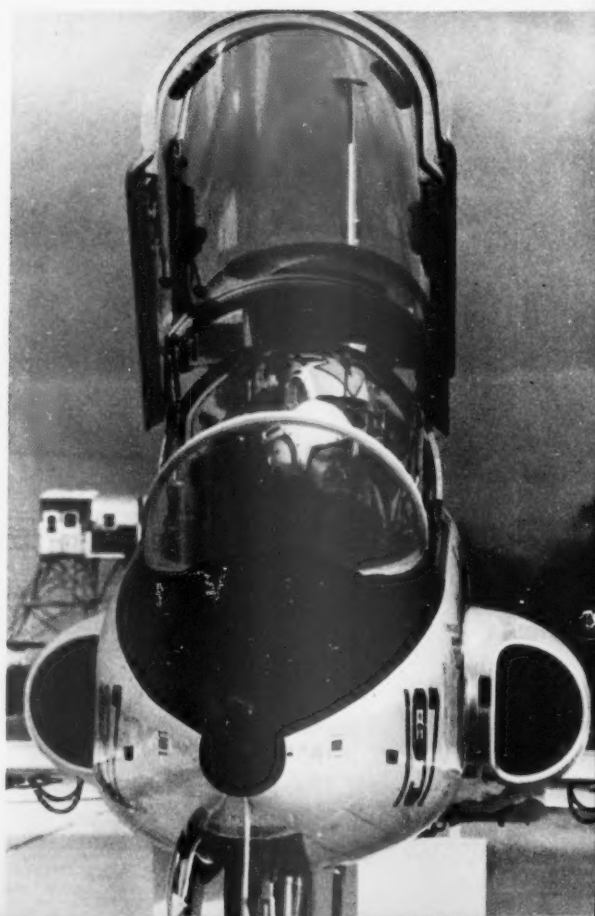


U.S. Naval Test Pilot School

# ***A special safety program for special safety problems***

By Richard P. Shipman  
APPROACH Writer

The experience,  
motivation,  
and maturity  
of the test pilots  
under instruction are  
important factors  
in the success  
of the TPS  
safety program.



LIKE the widely advertised beverage, flying at the Naval Test Pilot School (TPS) can be called "a completely unique experience." Pilots from diverse flying backgrounds arrive at TPS and are exposed to a wide variety of jet, helo, and prop aircraft — a total of 11 different types. During their months at the school, the TPUIs (test pilots under instruction) will fly them all. What's more, the future test pilots are expected to fly these aircraft with only minimum time for indoctrination on demanding test and evaluation training missions while sharing their flight time with a heavy academic load. Yet, despite these conditions that you would expect might pose significant safety problems, the Test Pilot School has enjoyed an excellent safety record. Since 1974 there has been only one major accident — a structural failure in the horizontal stabilizer of a T-2, suspected to be caused by spin stresses.



This formation demonstrates the variety of aircraft the TPS pilots fly.

This safety record is particularly commendable considering the types of aircraft flown. In addition to common Fleet aircraft (although usually specially configured) such as the TA-4, T-2C, and A-7, the Test Pilot School operates some uncommon and unusual aircraft. Included in this category are the U-1B *Otter* and the U-6A *Beaver* — tailwheel airplanes with reciprocating engines and conventional flight controls. These are excellent vehicles in which to demonstrate lateral-directional flying qualities, and they provide classic examples of flight control and stability deficiencies. Another interesting aircraft is the X-26A *Frigate* — a glider. In addition to being one of the more enjoyable flying experiences at TPS, glider flight introduces the students to the handling characteristics associated with high aspect ratio wings divorced from the thrust and drag effects of a powerplant. A variable stability B-26 (owned by Calspan Corp.) is a one-of-a-kind aircraft



1



This B-26 is capable of programming different handling characteristics.



Tail draggers like this U-6 Beaver offer the TPS student experience in aircraft with very different handling characteristics.

which can program different flight handling characteristics into its flying qualities.

Safely flying this variety of aircraft is obviously one of the special safety problems at TPS. LCDR Craig Steidle is the current safety officer charged with maintaining the safety and NATOPS program at TPS.

"We certainly have some unique safety problems here at TPS," says LCDR Steidle. "We have a wide variety of aircraft and many different configurations of the same aircraft. Yet all aircraft types are flown by all the test pilots under instruction during their syllabus. Helo pilots fly jets; jet pilots fly tail-draggers; and P-3 pilots find themselves hovering. This diversity of experience is critical to a test pilot because he must be able to recognize good and bad flying qualities and define them. Every aircraft has certain

flying characteristics, and experiencing these qualities gives the test pilot the ability to evaluate future aircraft. As you might expect, flying many different, unusual aircraft is one area where safety problems might arise."

This problem has been attacked by a) limiting the number of aircraft qualifications at any one time to three; b) strongly emphasizing checklists; c) placing the onus on the students to take independent action to ensure their familiarity.

"Our pilots fly about 15 hours a month, but obviously this isn't enough to maintain a satisfactory level of familiarity with 11 different aircraft," says LCDR Steidle. "Therefore, we've limited the current quals to three — which three depending on what stage the pilot is in and what his background is. This is a number we feel the pilots can handle effectively and safely.

"Even with three aircraft, though, a pilot's proficiency and familiarity are not going to be comparable to what they'd be if he were flying just one aircraft. That's why we emphasize checklists so strongly. You just can't sweep up one console and down the other, like a lot of Fleet pilots do, when you have only limited exposure to an aircraft."

For those used to elaborate, extensive aircraft qualification procedures, the checkout at TPS might seem minimal. Two dual hops — one fam and one checkflight — are the extent of the presolo checkout for pilots flying fixed-wing aircraft. (Helicopter pilots go through a jet transition syllabus prior to reporting to TPS.) The usual open- and closed-book NATOPS exams are given, and the TPS students must meet all the requirements for a NATOPS

The X-26A Frigate provides an enjoyable and educational flying experience.





Pilots of all backgrounds gain experience in rotary wing aircraft.

qual except flight time. The flight time requirements are formally waived until the TPUI completes TPS.

"We just don't have the time, instructors, or aircraft to give 5 or 10 fam flights before a safe for solo. And it hasn't really been necessary," says LCDR Steidle. "We put the onus on the pilots to check themselves out rather than spoon feeding them. Consequently, you see a lot of pilots logging cockpit time in the hangar and walking around aircraft with NATOPS flip pads open to the preflight section. We expect our pilots to display initiative and motivation in learning the basics of the aircraft so we can go on with the real purpose of the flight syllabus."

The experience and motivation of the TPUIs is clearly a critical factor in the school's excellent safety record. Rigid entrance requirements that dictate a minimum of 1500 flight hours guarantee that only experienced pilots enter the program. Although there is a provision for waivers of this flight time requirement, recent TPUIs have had no waivers.

This high level of experience is necessary for several reasons. "We are looking for the pilot that can adapt readily to new aircraft," says the safety officer. "We are training pilots that will have to step into a brand new aircraft and conduct a thorough evaluation of that aircraft. On occasion, this must be done in a very limited time — like 5 to 7 days. The pilots have to be able to make notes, record aircraft performance data, and conduct test missions — in addition to flying the aircraft. If all a pilot's concentration is completely tied up just flying the aircraft, he's not going to be a very effective test pilot."

Flight experience is also necessary because the student cannot devote his full time to flying at TPS. The academic curriculum occupies half of each day for the entire course, and studying takes up considerably more time. This adds



"Unique" describes flying at TPS.

additional pressure — and consequently possible safety problems — to the TPUI since he must devote so much of his time toward the rigorous academic program.

"The TPUIs spend half a day in class and half a day flying throughout their 11 months at TPS," comments LCDR Steidle. "It's easy to see how preoccupation with academic courses or problems can conflict with the flying half of the day, possibly meaning that the pilot is not 100 percent mentally and emotionally ready to fly. From my standpoint as safety officer, I try hard to avoid having the pilots backed into a corner where they feel excessive pressure to fly. This can easily happen when they get behind the syllabus because of bad weather, aircraft availability, or other factors. From the pilot's standpoint, we expect him to have the maturity and professionalism that will prevent him from pushing himself beyond his capabilities. Sometimes this means trading off some extra bookwork for extra flight preparation if that's what's necessary to be completely ready to fly."

Expecting maturity and professionalism of the test pilot students appears to be an overall policy at the Test Pilot School. Closely related to this, the outside observer notes a definite lack of the formal instructor-student relationship that can hinder learning in some situations.

"That's intentional," says LCDR Steidle. "I think it's good from a learning and a safety standpoint. We do everything we can to foster this type of atmosphere. All the instructors at TPS are more than happy to pass on the things they've learned. When the test pilot under instruction — we don't call them students — can be comfortable asking questions, and the instructors encourage it, you open up lines of communication that are vital to any learning situation. It may even prevent an accident. At one point at TPS, the instructors might have fielded a question with the response, 'Get in an aircraft and find out for yourself; that's the way I did it.' We don't feel that's a good approach, and we've gotten away from it." Continued



Even common fleet aircraft are specially configured at TPS.

4

What is the safety area of most concern right now at TPS? According to the safety officer, it is maintainability. This problem is significant. Maintaining a variety of unusual — sometimes one-of-a-kind aircraft — can pose as many challenges as flying these aircraft. Many of the aircraft are not even in the Navy inventory. What's more, many of the aircraft are specially configured and equipped with experimental black boxes or instrumentation.

Maintenance personnel currently assigned to TPS are ordered in according to normal shore detailing procedures. Despite the demands of the job, there have been no special requirements or procedures to apply for a position in the maintenance department at TPS.

"We've recognized the problem for some time," acknowledges the TPS skipper, CDR Jack Hamilton. "But how do you find people in the Fleet who are experienced in maintaining a T-38, OH-58, or an OV-1? Most of the training a person receives on these aircraft, he has to get right here — on the job. And then when he does start to become familiar with our birds, he's transferred. Considering the problems, I think the maintenance troops have done a wonderful job. In the long run, though, we

need more experience on our unique aircraft and greater continuity of our personnel. Therefore, we've decided to go to a civilian-contracted maintenance program here at TPS. I think it will work extremely well."

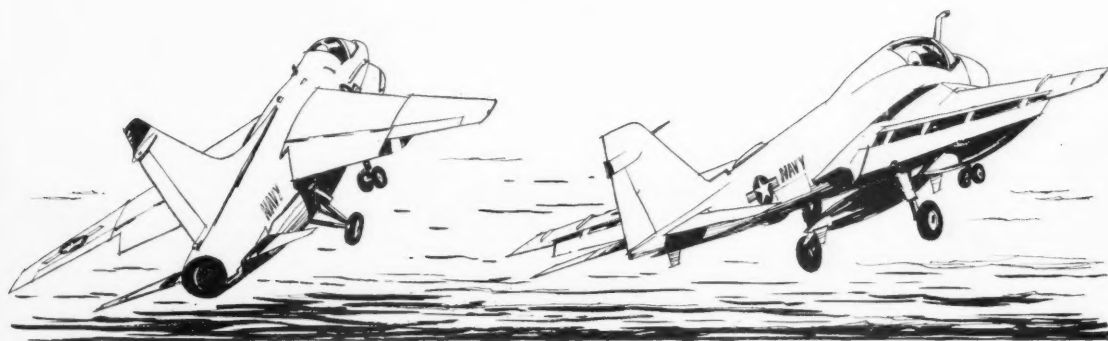
While probably no other squadron has a situation similar to that at TPS, there are nevertheless some lessons that everyone can learn from the safety program there. Every aviation activity — even those operating like aircraft — have special and different strengths and weaknesses. Therefore, a safety program has to be tailored to that individual squadron. At TPS, emphasis is placed on those areas of potential problems — multiple aircraft qualification, student overextension, and maintenance, for example — while less emphasis is placed on the strong points in the squadron — pilot professionalism, judgment, and overall experience. One of the reasons for the success of the safety program at TPS is that they've identified the problems peculiar to their command and have directed their program toward attacking those problems rather than going with a "standard" safety program that may have worked for some other squadron. It's a lesson that can be applied by everyone. ▶

*There is nothing wrong with having nothing to say, just as long as you don't say it out loud.*

*Ace L.*

# THE "ROUTINE" CARRIER LAUNCH

By LCDR Paul Statskey  
VA-195



IT was a beautiful, sunny day in the Philippine Sea. I was scheduled for a test flight, and was quite pleased. It was an engine test in an A-7E, and I had flown enough of them over the years to accomplish it without anxiety. I left the readyroom eager to perform the test and bag another trap.

On preflight, I noticed there was an abnormal amount of wind flowing up the tailpipe due to the deck spot. I stored that information away for the engine start. As I was performing the prestart cockpit checks, I discovered that the wheel brake antiskid switch was out of position. Since the use of antiskid is prohibited during shipboard ops and the switch has a red guard on it, I was particularly concerned that it was ON.

The huffer arrived and the engine start was commenced. The RPM was slow to build up to the required percentage, but it made it eventually so I brought the throttle around the horn. Ignition was immediate, but the RPM continued to increase at a slow rate, forcing an excessively high turbine outlet temperature. I shut down the engine to prevent the imminent overtemp. Questioning the power of my starting unit, and realizing that the wind up the tailpipe had at least contributed to the slowly increasing RPM problem, I requested a new huffer. As it arrived, the ship began turning, and the combination of changes was sufficient to allow a normal start on the second try.

With the poststart checks complete, I signaled for the chocks to be pulled and reached for my oxygen mask. Squadron procedures and good headwork require the mask to be used whenever the aircraft is not chained down on the flight deck. Testing it in the same old manner I had learned 10 years previously in the training command, I discovered that the regulator had quit and that it was just blowing oxygen through my mask. So I got a new mask and began my taxi.

As I approached the catapult, I checked the weight board, and it was incorrect. The flight deck crew was used to launching A-7s with a droptank, and as this was a test hop, the aircraft was clean. So I signaled for the appropriate adjustment in weight, and the actual weight was confirmed by the air boss via the UHF.

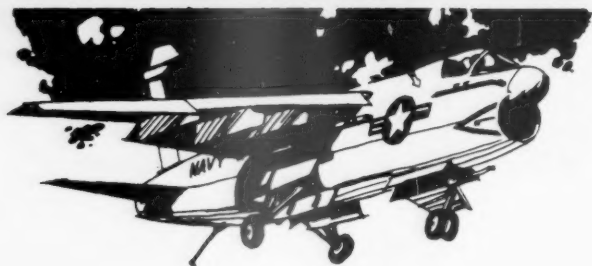
Once on the cat, the engine run-up was satisfactory. After a check of the gages, caution lights, and a cockpit wipeout, I acknowledged my intent to fly with the appropriate salute. By this point, I was keyed like a pilot in an emergency procedures simulator, anticipating something else to go wrong. It did! As I cleared the deck edge with a successful stroke from catapult No. 4 on the angle, my vision was filled with an A-6 that had been fired off cat No. 2 on the bow almost simultaneously with me. The main problem was he had cleared to PORT, rather than the correct starboard turn. I am not certain what the consequences would have been had this been a bombing mission and I had 5000 pounds of ordnance. But clean, I was able to perform the hottest clearing turn of my career and turn inside the A-6 until he finally rolled out and I could get some separation.

Actually, after that, the rest of the hop was completely successful and without further incident. It was, however, flown mostly wings level with an abnormally active scan pattern and excessive quantity of oxygen depleted.

So what's the point of this true story? Simply this. Aviation is a profession that must be concerned with details. Overlooking, disregarding, or forgetting apparently small items is what sets the stage for obvious big problems. Learning correct procedures, establishing good habit patterns and adhering to them rigidly will go a long way in helping you to maintain your longevity in naval aviation. There's no such thing as a "routine" carrier launch. ◀



# AIR BREAKS



6

**Momentary Lapse.** An aircraft daily inspection of a C-118B had been completed except for runup. Two qualified taxi aircrewmembers were sitting in the cockpit seats. They completed the preturn checklist and awaited signals from the director to start engines.

The director was in sight, forward of the No. 2 engine, and one other crewman was standing the fire bottle watch behind and slightly outboard of the No. 3 engine. The all-clear signal was *not* given, and the director left his position and disappeared under the nose toward the fire watch to ask him a question.

The taxi crewman in the copilot's seat saw a thumbs-up signal from the fire watch and started turning No. 3 prop. As the prop began to turn, the director walked through the prop arc. He saw the prop turning and put out both hands to cushion the blow. The prop struck him in the chest and chin and knocked him on his buttocks.

Luckily, the director escaped serious injury or death, but he was struck smartly on the chin — enough to require eight stitches.

The cause of the near-tragedy was the action of the taxi crewman in the right seat engaging the No. 3 starter without an all-clear signal from the director, and without clearance to turn No. 3 by the taxi crewman sitting in the pilot's seat. Contributing to the incident was the director leaving his position and walking through the arc of the prop.

The director had been aboard for only 1 month, but had been in training the previous 2 weeks, and demonstrated satisfactory knowledge of the proper line procedures. He had performed several starts satisfactorily under direct supervision of the line chief. Also, 2 days before the incident, he had attended a shop lecture, "Dangers of the Spinning Prop."

A horrible mess was averted by a matter of an inch or two, a second or

two, and lots of luck. Those involved were victims of complacency, inattention to detail, failure to follow SOP, and carelessness. All the meetings, lectures, films, and instructions in the world cannot prevent that momentary lack of attention that can kill. Look alive, and for goodness sake *T-H-I-N-K*.

**Carefully.** LCDR Carl M. Peterson and his crew from HS-12 were operating an SH-3H on a sub tracking exercise. After a few minutes dipping at 300 feet dome depth, he noted a port drift at 4 knots.

The crew reported the sonar reeling machine slowly unwinding. LCDR Peterson evaluated the problem as the sonar cable fouled on the submarine. He directed the sonar guillotine to be armed and eased the helicopter into sideward flight to port.

After establishing communication with the sub, the HAC requested it to surface and turn into the wind. The submarine surfaced and turned into the wind while continuing at 4 knots to maintain way. The sonar dome was noted to be trailing along the port side with the cable extending around the port bow plane, back to the bridge, and up to the forward periscope. Due to the 4 knots drag through the water, the cable continued to slowly unwind from the helicopter reeling machine.

To prevent completely unwinding the sonar cable with the probable result of fouling the sub's screws, the HAC climbed to 225 feet which lifted the sonar cable clear of the water. The sub lowered the forward periscope, and sub personnel freed the cable from the periscope and the bridge. A helo crewman reeled in the slack cable clear of the diving plane. Then the helo crew completed a free stream recovery and raised the dome. A visual inspection of the dome and cable revealed only cosmetic damage. The helo crew continued with the exercise.

Normally, when a helicopter sonar

cable becomes fouled on a submarine, the dome and cable are lost. However, LCDR Peterson and his crew, with the fine cooperation of the sub personnel, were able to save scarce equipment without damage to the submarine or helicopter.

**Hey, Wait!** Two CH-46s with an AH-1J flying cover were participating in a simulated MedEvac as part of a field exercise. During the pickup portion, with the AH-1J flying overhead calling out enemy positions and simulated fire, the lead aircraft followed instructions from the AH-1J to pull out of the landing zone. He expedited takeoff.

The No. 2 CH-46 was apparently on the wrong frequency and didn't hear the warning to take off. Upon seeing the lead aircraft lift off, the pilot of No. 2 followed without coordinating with the crew chief. It just so happened that the crew chief, with full knowledge of the pilot, had exited the aircraft as part of his duties, to help the troops board the helicopter.

When the pilot of No. 2 helo began to lift off, the crew chief ran to the aircraft to try to get aboard through the rear hatch area. However, the ramp was being raised, allowing the crew chief to get only part of his body

inside the aircraft. He hung on momentarily before falling about 15 feet from the helo.

The crew chief was picked up and taken for medical assistance. Subsequent examination disclosed no broken bones or internal injuries. He was lucky!

Pilots involved in games and exercises must remember that safety is the primary consideration throughout the mission. No pilot, no matter what the situation, should ever take off without establishing communications with his crew chief, especially when troops are being boarded.

**A Delta Sierra Taxi Pilot.** After a RON, the pilots of a TA-4J prepared to depart for Homeplate. They manned their aircraft, and the boarding ladder was removed and placed on the deck about 40 feet to the left of the aircraft.

There were three linemen launching the transient. The taxi director had personnel on each side of the aircraft remove the chocks. The one on the port side, after removing the chocks, scurried to a position on the opposite side of an adjacent parked A-4.

The taxi director brought the TA-4 forward, gave the brake-check signal, and then a come-ahead signal. The pilot disregarded the come-ahead signal and started an immediate right turn. The director again signaled straight ahead, but the pilot paid no

attention. After 45 degrees of turn, the pilot went to high power.

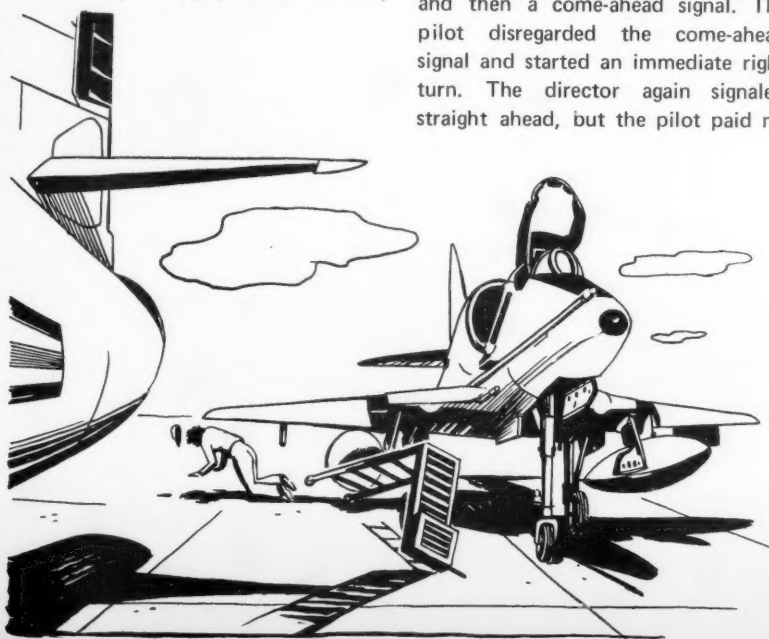
The jet blast turned the ladder into a missile and blew it between the nose gear and main gear of the adjacent A-4. It struck the right leg of the chockman, who was crouched over with her back to the blast. The blow knocked her down and severely bruised her knee.

The pilot failed to follow the signals of the taxi director and used excessive power in proximity of the line area. Had he followed the director's signals, not only would he have avoided injuring the chockman, but also would have had sufficient power to make a turnout. He gets a big Delta Sierra.

**Flat Spin.** The crew of a UH-1N had just completed a rappelling mission, and headed back to Homeplate. During their final approach to land, with the cargo doors open, the crew chief noticed soundproofing material in the cabin begin to separate from the transmission housing.

The crew chief secured the soundproofing on the right side of the transmission, but was unable to prevent the soundproofing on the left side from tearing loose. It whipped out the open door. The crew chief saw it strike the left synchronized elevator, cross the aft portion of the tailboom, and be drawn into the tail rotor.

The soundproofing was torn to shreds and caused sudden stoppage of the tail rotor, shearing the drive shaft between the 42-degree and 90-degree gear box, and separated the tail rotor driveshaft from the main transmission. They were at 150 feet altitude when the helo began a series of 360-degree turns to the right. The pilot, 1st Lt Clifford B. Holbrook, USMC, entered a full autorotation and landed the aircraft upright on the skids. Everyone evacuated without injury, and only slight damage occurred to the helicopter. Well done, LT Holbrook.





# WELL DONE!

ONE of the varied missions of the CH-46 in the combat support role is called Cast and Recovery. To effect this task, Navy Special Warfare personnel are dropped from the ramp of the helicopter and picked up via a Jacob's ladder suspended from the rescue hatch in the belly of the aircraft.

LT John Dailey and his copilot, LTJG Jerry Cerny of HC-11, briefed, and along with their crewman, AD1 Lonnie Kinderman, began another routine mission. After embarking 17 BUDS (Basic Underwater Demolition Students), they began the cast phase by dropping two parallel strings of 9 and 8 men.

The recovery began smoothly, and with 13 pickups completed, the aircraft was moved over the next man in the string. At 5 knots and 10 feet, the No. 1 engine dropped to ground idle due to what was later determined to be a temporary short in the electrical engine control system. LT Dailey immediately began a slide to the left to clear the man in the water, and turns drooped to 90 percent  $N_1$  as the *Sea Knight* settled into the water.

While the pilot utilized his single engine to hold the aircraft high in the water, AD1 Kinderman quickly and expertly carried out his responsibilities in the cabin. The Jacob's ladder was pulled through the rescue hatch, the hatch secured, and the onboard passengers were directed to depart via the cabin door to the standby rescue boat.

The crew continued their emergency procedures, and the No. 1 engine programmed itself back to fly. A water takeoff was commenced, but as the HAC applied power, the No. 2 engine programmed to ground idle. Faced now with a totally unreliable powerplant, LT Dailey executed procedures for a single-engine takeoff. As the running takeoff from the water was initiated, both engines returned to normal operation. LT Dailey declared an emergency and returned to land at NAS North Island.

Correct crew coordination coupled with a rapid and professional response in a situation which allowed little margin for error prevented both injury to personnel and damage to or loss of an aircraft. ◀

# DELTA PATTERN BLUES

By LCDR Ron Hartinger  
VAW-115

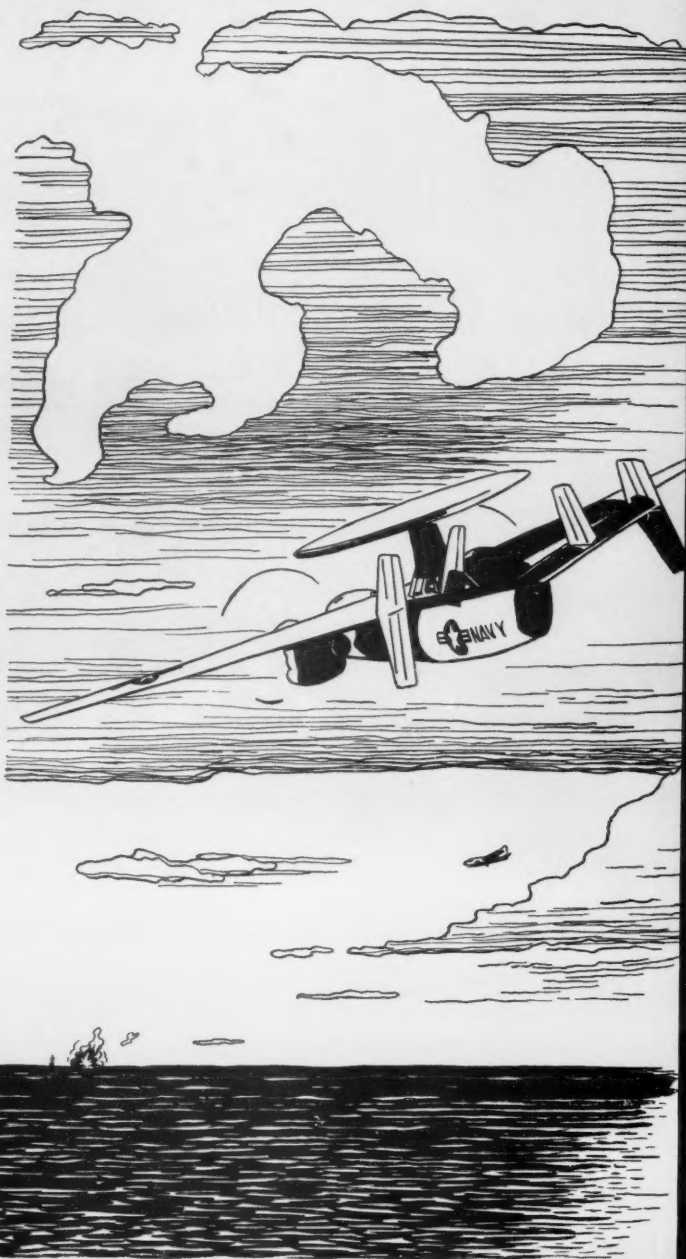
JUST a few years ago, there were numerous types of aircraft milling around in the starboard delta pattern. Now, only a few remain. It is probably one of the safest places to orbit while anxiously awaiting "signal Charlie." Normally, we, the E-2s, are the only aircraft at 500 feet on the starboard side of the ship, with the helo below at 300 feet. Getting there safely, though, can sometimes be a bit difficult.

Upon returning from a normal double cycle, the weather was typically great everywhere except at the ship, and CATCC was having a difficult time deciding between a Case II and Case III recovery. An E-2 was told to anchor in the starboard delta pattern, while everyone else would be making a Case II recovery. The E-2 was vectored towards its delta position from aft of the ship, below a 1200-foot broken to overcast layer. Visibility underneath was more than 10 miles.

At approximately 15 miles from the ship, the *Hummer* pilots observed another aircraft passing coaltitude on an opposing course. It was reported to CATCC, who indicated they did not hold the target. They concluded that it must be a helo or the duty tanker.

As the E-2 proceeded inbound to about 10 miles, it saw another aircraft to its right which crossed over and slightly behind. At the same time, the pilot of the E-2 observed a flash of light and smoke on the surface just aft of a nearby destroyer. The *Hawkeye* crew realized they were in the middle of a hot-spar area! Needless to say, they immediately reported their observations to CATCC, who later admitted in the debrief that they were not aware of any bombing taking place within 10 miles of the carrier.

The point is, no matter how many times you've done it (whatever it is you may be doing) — heads up — watch out for the unexpected and be ready for it. This definitely applies to even such routine events as the starboard delta — and your trip to it.



The accident was caused by . . .

# ~~PILOT~~ SQUADRON ERROR

COMMAND safety awareness; command safety consciousness; command attention to safety — are these trite phrases used in change of command speeches — or vital elements in a squadron that save lives and airplanes? The concept of total command involvement in safety is a hard one to quantify and define. But its existence in a squadron is very obvious; as is its absence.

Two fliers were killed in a tragic, preventable accident. The official cause was undetermined, but the investigators strongly suspected pilot error. But was this the whole story? Not really. Investigation into the accident revealed many factors that pointed to less than total command involvement in safety. How significant was this in causing the accident? A difficult if not impossible question to answer. Read the account and decide for yourself. What could have prevented this avoidable accident?

The involved pilot was good with the stick and throttle. Although he had limited experience — 650 total hours and 350 in type — he was well regarded by his peers and the commanding officer. Unfortunately, his skill in the mechanics of flying was apparently not matched by his judgment and maturity. Overconfidence and immaturity combined with limited experience can be deadly. It was in

this case.

The accident occurred shortly after takeoff. Cleared for a right turn after takeoff (on a VFR flight plan), the pilot initially turned left toward a restricted area. The crew apparently realized their mistake and made a rapid reversal to the right. Too rapid. The aircraft apparently stalled and crashed. The airmen ejected outside of the envelope and were killed immediately.

All evidence in the investigation pointed to a stall/spin/crash. Extensive investigation and analysis of wreckage failed to reveal any material failure that would have caused the accident. A computer printout revealed that the aircraft could not turn as tightly as it did, given its weight and speed, without stalling. And the AOA gage was recovered indicating a stalled angle-of-attack.

So there it is. The pilot messed up and stalled the aircraft. Corrective action? Recommend that pilots don't stall their aircraft after takeoff, or get further training in stall recognition, then file it away in the computer bank. But is this the whole story? Are those recommendations going to prevent similar accidents in the future? Let's look further into this accident.

Reviewing the events leading up to the crash revealed a

A rapid course reversal after takeoff resulted in the aircraft's stall and crash.





The cause of the accident goes beyond "pilot stalled aircraft."

trend of poor judgment, immature acts, and violations of flight discipline by the pilot in command. For example:

- The pilot was filed on a VFR flight plan when he crashed, contrary to CNO directives.
- The pilot was observed in base ops phoning his family telling them to look for him as he came over their house.
- Discussion with squadronmates revealed that this pilot had previously flown over his parents' house and had performed a touch-and-go at a nearby municipal airport although the runway bearing capacity was insufficient for his type of aircraft.
- The crew had continued their extended cross-country flight despite failure of an avionics cooling fan which could have caused failure of the aircraft's entire communication/navigation package.
- The flight was not planned to enable LOX servicing. The first destination was NOTAMed for no LOX, and the return legs were flown to bases without servicing capability.
- The pilot was 10 months overdue for his flight physical.

While none of these items can be directly assigned as a factor in the accident, they describe an individual who was going about his flying in a nonprofessional and careless fashion. It also points up a squadron that was not imbued with "safety consciousness."

The hard questions, then, are where did the fault really lie in this accident, and more importantly, how is this kind of accident prevented in the future?

It seems apparent that both the pilot and the squadron were to blame. To what degree they were each responsible would undoubtedly depend on individual viewpoints. But clearly, the cause of this accident goes beyond "pilot stalled aircraft." This is where that intangible area of "safety awareness" within the command comes to the fore.

The poor safety record of the pilot's squadron prior to his accident, and the lax manner in which he conducted his flight would indicate that the emphasis on safety was not all pervasive within this squadron. It would be pure

conjecture to say this accident would not have occurred in a squadron that had a total emphasis on safety. But consider what such a squadron would have done that might have prevented an accident such as this one.

- The command would have had a clearcut policy of filing IFR on cross-country flights. It would then have enforced this policy through supervision and example.

- Peers of the pilot involved would have cautioned the pilot about his violations of flight discipline. If that had no effect, notifying supervisory personnel of the problem would have been appropriate.

- The pilot would have been grounded until he produced a current up-chit certifying completion of his annual physical.

- Department heads, the CO, and XO would have been aware of potentially dangerous trends within pilots in the squadron. Cross-countries could then have been scheduled more cautiously.

- Pilots would have been briefed and knowledgeable on maintenance aspects of cross-country flights. They would have been aware of the dangers of flying without a cooling fan, and they would not have ignored basic servicing requirements.

- The importance of flight discipline, professional airways flying, and responsibility would be repeatedly stressed and demonstrated by the squadron command. Similarly, penalties for violation of these traits would also be clearcut.

A strong safety program is, of course, not an absolute guarantee that a pilot will not deviate from squadron policy or not have an accident. But command attention is a proven, effective safety device; just look at any squadron that has gone accident-free for any period of time. They have it. How does a squadron get it? Trite as it sounds, to achieve an atmosphere like this is an "all hands" evolution, with the CO and XO the key. They set the tone; they set the emphasis; they set the example. The program will only be as good as they want it to be and that they insist it will be. The most conscientious safety officer in the world can't make a squadron safe unless he has 100 percent command backing.

Similarly, the CO and XO can't do it alone. They need the support of all the supervisors and workers in the squadron. They need their subordinates to share and spread their enthusiasm and support for safety.

As phrased by one endorser to this mishap: "The factors in this accident served as a graphic example of failure of an aircrew and others within the squadron to fulfill their personal responsibilities." So, was the pilot or squadron to blame? Both must share. And that is where corrective action lies: personal responsibility by pilots and an all pervasive safety attitude within the squadron. ◀

## LT Raynes and ENS Clark VF-101

LT Gerry Raynes and ENS Richard Clark of VF-101, flying an F-14, were on radar vectors to the break at Grissom AFB after a cross-country flight from Pensacola. The break and subsequent touch-and-go were normal, with the aircraft fully functional. The crew requested a full stop landing on the next approach, with 3100 pounds of fuel onboard.

With approximately 15 degrees to go to runway heading, the *Tomcat* was at 300 feet altitude, 14-15 units angle-of-attack, with 20-25 degrees left wing down and a 600-700 foot-per-minute rate of descent. At this critical point, the crew felt a hard jolt and heavy vibration. The aircraft dutch-rolled and settled tail-first. LT Raynes immediately selected both afterburners to zone 5. The F-14 then commenced a relatively slow increase in angle-of-bank to 65-70 degrees left wing down with the nose slowly dropping to 10-15 degrees below the horizon. Full right rudder and full right stick had no effect on the roll.

LT Raynes deselected right burner, at which time the nose came up to

about 5 degrees below the horizon and the rate of descent slowed from 1000 fpm to 500-600 fpm. The pilot saw the radar altimeter passing 250 feet, and the crew jointly made the decision to eject at 200 feet if the rate of descent could not be halted.

Fortunately, the right wing started to come down as the aircraft passed about 220 feet. When the right wing was within 20-30 degrees of the horizon, the right afterburner was reselected to zone 5. The aircraft started to climb. Minimum altitude on the recovery was about 100-150 feet.

With the aircraft more or less under control, the crew declared an emergency, accelerated to 300 KIAS, and climbed to 4000 feet AGL for some troubleshooting. The following caution lights were on: PITCH STAB 2, ROLL STAB 1 and 2, YAW STAB OP, YAW STAB OUT, RUDDER AUTHORITY, and HYDRAULIC PRESS. MASTER RESET was depressed for about 30 seconds, but the only light that could be extinguished was ROLL STAB 1. Further investigation revealed the FLIGHT HYDRAULICS pressure was 2400 psi. Thirty seconds later it went to zero. The pilot secured the

# BRAVO ZULU

bidirectional pump and stowed the right ramp.

During this time, the RIO was reading the emergency procedures for each caution light. After the FLIGHT HYDRAULIC PRESSURE 0 procedure was read, the pilot selected HIGH on the backup flight control module. At this point, he realized that the rudder pedals were frozen, as the aircraft decelerated and the ball moved fully right. The rudder indicators read 30 degrees left and 3-4 degrees right.

Slow flight of the *Tomcat* revealed marginal control below 150 KIAS but adequate control above 150 using asymmetric thrust. Even with idle power on the right engine and military power on the left, the ball still remained fully right. No procedures are available in the pocket checklist for hover rudders.

The aircrew read all the caution lights to the tower, informed them of the control problem, and requested an arrested landing. Tower replied that the arresting gear was out of service due to an ice- and snowstorm several days before. The F-14 crew had little choice but to make a normal landing.

LT Raynes took his aircraft by the tower first to determine if the nose gear was centered. Tower reported that it was, so a full stop was requested. The landing was made on the first pass with right wing down to counter the left yaw and a slight right crosswind. Asymmetric thrust also helped to maintain runway lineup.



LT Raynes (left) and ENS Clark

The pilot stopped the aircraft in 5000 feet, using differential braking to maintain runway alignment. The RIO had to pin the gear (after the right engine was secured) since the Air Force ground crew could not locate the downlocks. With the locks installed, the *Tomcat* taxied clear of the runway and the pilot shut it down. The rudders and rudder pedals were still frozen, and fluid from the combined hydraulics system was porting from the static drain on the outside of the port engine nacelle.

Inspection revealed a catastrophic failure of the port rudder actuator.

Further maintenance checks with only the flight hydraulic system pressurized caused the left rudder to drive fully left, as occurred in flight. Rudder pedal movement had no effect on the left rudder. Troubleshooting revealed that the flight system pressure and return hoses were reversed. The combination of this "Murphy" (not at the squadron level) and a failed flight hydraulic system almost caused an accident. The hydraulics lines were reinstalled correctly, and the system checked good. The aircraft was returned to flight status.

LT Raynes displayed outstanding

airmanship in recovering his *Tomcat* from a critical emergency condition low to the ground. He was ably assisted by his RIO, ENS Clark, who made numerous warnings to level the wings, select afterburner, and constantly advised the pilot of their barometric altitude during the critical early moments of the emergency. He then coordinated with the pilot on the troubleshooting, reading the appropriate emergency procedures and assisting the pilot in taking the correct action. It was a totally professional job that saved a valuable *Tomcat* and an invaluable crew. ◀

### ENS Richard J. Knowski VT-6

ENS Knowski, a student, was on a solo training flight one afternoon and called Saufley tower for landing information. He was cleared to enter the pattern and reduced power in his T-28 to descend to 900 feet.

Just prior to reaching 900 feet, he added throttle (20" MAP) but did not receive any engine response. At the time, he was on a 2-mile initial approach to Runway 18. Quickly he picked up his speed brakes and ran the throttle to the firewall but continued to descend. He cycled the throttle and

props with no response.

ENS Knowski called the tower, reported an engine problem, and advised he was continuing straight in. The tower called for the gear and was advised they were down and locked. ENS Knowski continued his approach and began a flare to land just as the RDO (runway duty officer) requested a flare. The pilot made a routine landing, followed the crash crew to the line, and secured the engine in the chocks.

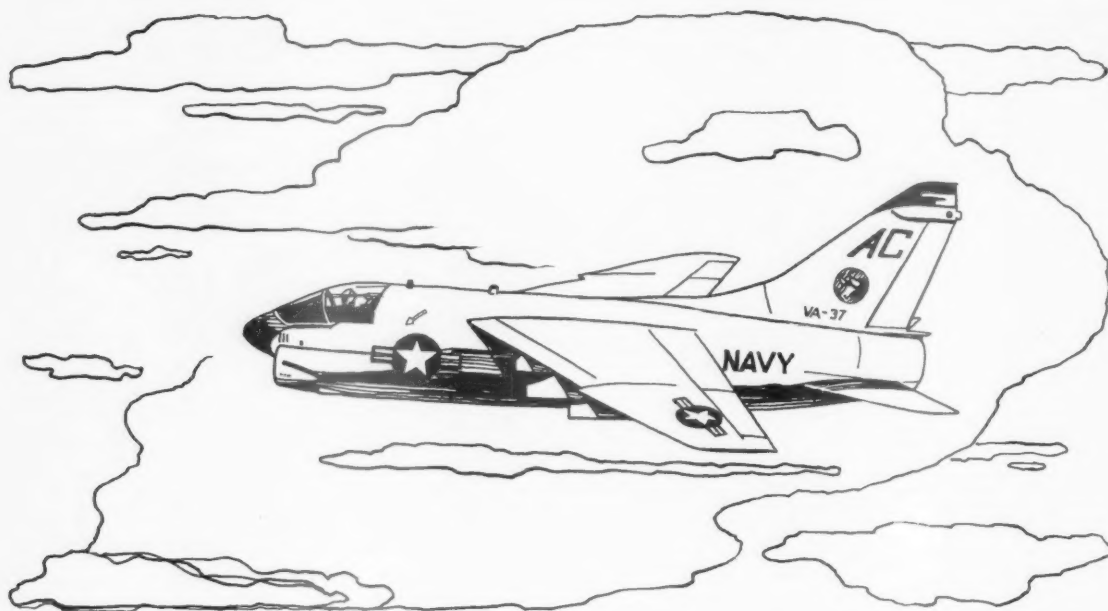
Until the engine failed to respond

to the throttle, ENS Knowski had no warning that anything was wrong. Investigation revealed a nut and bolt were missing, allowing the throttle control rod from the carburetor to disengage from the control lever. The missing nut and bolt could not be found.

ENS Knowski had limited experience (30 hours), but his knowledge of procedures and composure were responsible for his successfully handling a low-altitude emergency. Well done! ▶



# CLEARED FOR THE APPROACH



By LTJG Jim Carman  
VA-37

14

MY weekend training flight from NAS Atlantic Coast to Big City Air Force Base was just about half over when I heard those familiar words, "Cleared for the approach." Then I remembered. Three years ago today, a commercial airliner was also cleared for an approach at a large metropolitan airport across town from my destination. Regrettably, things did not go as routinely for the crew of that Boeing 727 as they did today for my aircraft, Alpha Charlie 301. For some unknown reason, the crew of that airliner misread their approach plate and allowed their aircraft to settle well below the initial approach altitude of 3400 feet MSL. Subsequently, their aircraft impacted the western slope of an 1800-foot mountain in the Blue Ridge Foothills at an altitude of 1669 feet.

Throughout my postflight and the remainder of the day, I continued to wonder how an experienced crew could commit an error of such a basic nature, resulting in the death of 92 people and the loss of a valuable aircraft. After some additional research, I learned that unexpected severe weather at the destination airport had necessitated a change in their flight plan.

The report of the National Transportation Safety Board revealed that the flight had originated at a large midwestern

city. It was scheduled to make one intermediate stop prior to proceeding to its final destination on the Atlantic Coast. Approaching the intended point of final landing, the crew learned from Center that winds were sweeping the runway at 40 to 45 knots. Also complicating the situation was low visibility caused by fog and rain showers. However, a superior facility with a longer runway and less traffic congestion was available across town with acceptable weather conditions. Neither the captain nor his first officer had any desire to test their combined flying skills against crosswinds of such intensity. Accordingly, the decision was made to proceed to the alternate.

The cockpit voice recorder disclosed that once this decision had been made, the crew began to relax and prepare for the upcoming instrument approach and landing. None of the crewmembers regularly flew into this new destination airport. In fact, only the first officer had ever flown from this facility, and that was several years ago. This resulted in some confusion among the crewmembers concerning minimum altitudes to be maintained throughout the instrument approach. Ultimately, the first officer, who was flying the aircraft at the time, elected not to question the captain's judgment regarding specific altitude

restrictions on this VOR-DME approach. Perhaps he was deferring to the captain's 19 years of aviation experience as opposed to his own 9 years. No one will ever really know. Exactly 4 minutes and 10 seconds later, the aircraft crashed into the side of a small mountain.

Everyone onboard was killed instantly.

Several days later, the National Transportation Safety Board finished transcribing the tape of the cockpit voice recorder. The final entry in this voluminous document read: "1109:22 — Sound of Impact."

Although this accident involved a civil airliner, the lessons learned are just as applicable for military aircraft. This scenario may someday happen to you if less than complete preflight preparation is tolerated or exercised by you or your command. Whether it be a cross-country or low-level mission in a tactical jet, a cross-country in a helicopter, or a Rota run by our patrol friends, each evolution requires that the crew be well versed in NATOPS emergency procedures for their particular aircraft and familiar with acceptable divert fields along the planned route of flight. Additionally, when the forecast weather is below 3000 and 3, good headwork says that merely picking an alternate with satisfactory weather will not hack it.

Questions to be answered regarding both the destination and the alternate include:

1. Runway length and availability of arresting gear.
2. Type of nav aids serving these facilities.
3. Annotating the appropriate approach frequencies — sure beats tearing pages out of the Enroute Supplement at the last minute.
4. Fuel management throughout the flight.
5. And last but not least, studying the published instrument approach procedures to ensure that any confusion concerning minimum safe approach altitudes will be resolved prior to "wheels in the well."

Over the last 15 years, naval aviation has come a long way. In 1962, the All Navy and Marine Corps Major Accident Rate was 1.55 per 10,000 flight hours. Moreover, 264 aircrewmembers and 329 aircraft were lost that year. By contrast, in 1977 the men and women of Naval and Marine Corps Aviation have amassed an improved Major Accident Rate of .64 per 10,000 flight hours. Losses have been reduced to 88 fatalities with 104 aircraft destroyed.

Improvements such as these do not just happen overnight. It takes a team of dedicated professionals following sound maintenance procedures and exercising good judgment in the air as well as on the ground to achieve such noteworthy results.

To continue to improve this safety record in 1978 and beyond, all flights must be thoroughly planned on the ground so that there will be no surprises the next time you are cleared for the approach. ◀

## Oops, Slips!

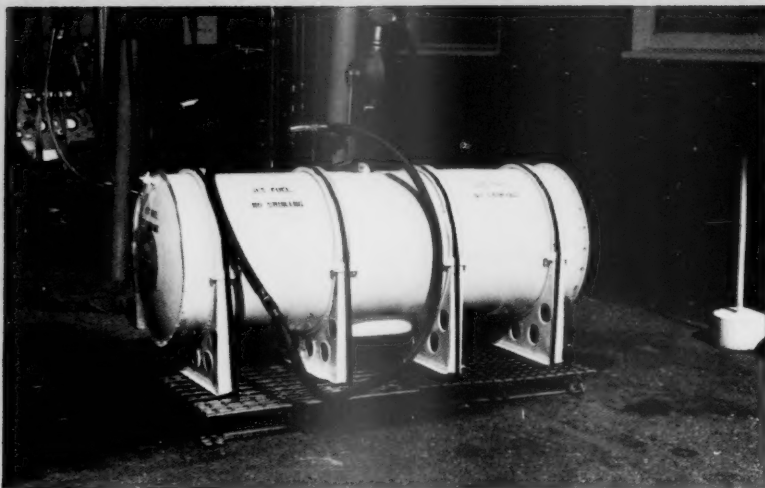
During a night respot, an RF-8 was being towed toward the starboard bow, parallel to the starboard catwalk. The aircraft was turned inboard, and the tail swung outboard over the catwalk. The tail zapped the ship's low visibility bell, causing the port UHT tip cap to break off.

The aircraft handling crew had just finished moving three A-7s over the same point without incident. The A-7 tail is shorter, and the UHT is higher above the deck.

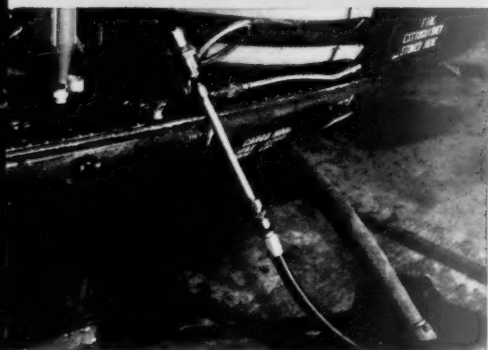
The ship's bell is mounted on a counterweighted arm and can be raised above flight deck level for use, or stowed below flight deck level in the catwalk during flight quarters. The bell had been raised to accommodate the low visibility watch but wasn't returned to the stowed position for respotting aircraft.

Several factors influenced the ding. It was dark, the deck was wet from rain, the starboard catwalk wasn't checked for obstructions, and the bell was left raised.

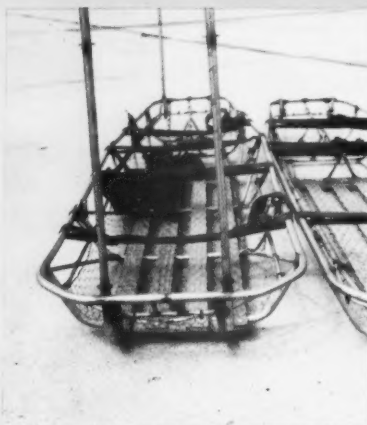
RF-8 aircraft with their long fuselage and low tail are susceptible to crunches. Aircraft handling crews are aware of the towing and handling characteristics of the RF-8 but must not forget them. Crews must be alert at all times. At the time of the crunch, there was no responsibility for the aircraft handlers to check the bell's position. Now there is!



A 150-gallon, pickup-truck-transportable fuel tank. Weight at high-density altitudes equates with performance. A fuel supply in a parking lot at 9000-foot elevation and 70 miles from the nearest alternate source frequently means the difference between life and death or risk and safety.



A fuel dump hose (RAMEC pending). The H-1 has no fuel dump system. A simple hose with the appropriate fitting allows quick depletion of an auxiliary fuel bag for a weight reduction of up to 1000 pounds (also ideal for LPH operations/cyclic times). This allows that 13,200-foot elevation landing when the planned 3½-hour search mission develops into a 1-hour rescue/retrieval mission.



Compact stowage of two Stokes litters by the manufacture of four posts and eight cuffs (average fixed-wing crew of two). Stokes litters may also be cut in half to form a compact 3-foot bundle for storage and transportation and then be reunited through the use of unions for emergencies.

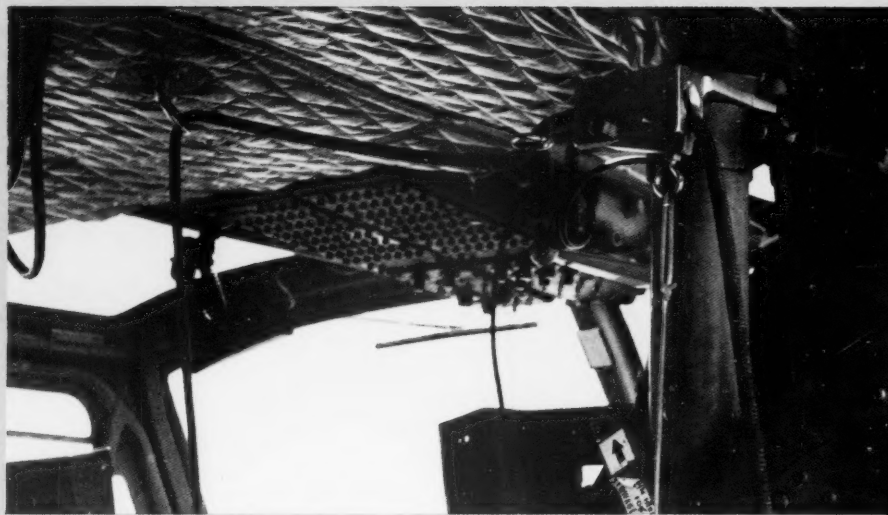
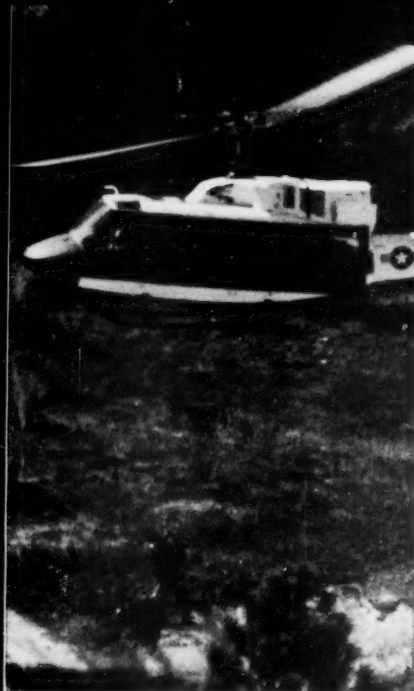


# SAR CONUS

By LCDR Dale Haan, USN  
Naval Weapons Center, China Lake

MANY Navy flight operations occur overland, and local SAR (search and rescue) assets necessarily operate in rescue environments different from those at sea. The Naval Weapons Center China Lake rescue helo crews fly missions and retrievals in the below-sea-level, summer conditions of Death Valley and up to the 13,200-foot elevations around Mt. Whitney.

As an outgrowth of our SAR efforts and training, Naval Weapons Center has designed or installed in our UH-1N helos several innovations. Most important is the ability to coordinate and communicate on the scene with nonmilitary agencies such as the Civil Air Patrol, U.S. Forest Service, and state-sponsored civilian rescue teams. This involves the installation of VHF radios for air-to-air communications (116.00-150.00 MHz); for air-to-ground communications (15.00-174.00 MHz) in simplex and duplex modes; and the use of the standard UHF and low band VHF-FM. (A limitation to the standard military UHF band is a severe limitation on SAR operations.) Additionally, a capability to direction-find over this



Design of a mechanical self-actuating brake for hoist training operations with a safety line (also applicable to H-2, H-46, H-3 type helos). (We are indebted to the NAS Lemoore SAR crew for their near-parallel endeavors and inspiration.)

spectrum is also highly desirable. Most if not all of this additional communications equipment must be open purchased, often at a modest cost.

The photos and chart illustrate a few of the methods that China Lake SAR has taken or is developing to expand its capabilities and safety. A future project is the adaptation of U.S. Marine Corps xenon tank searchlights for night mountain work — an otherwise hair-raising experience. The impetus for these innovations has been the rugged terrain over which we work, the necessity of flying many operational VIP and project flights while maintaining a SAR capability with limited assets. Working at the edge of the aircraft's performance envelope, although rewarding in lives saved, is demanding and unforgiving. Planning and preparation can give you the edge.

*Several innovations mentioned are one of a kind. SAR units do not get excited. They are not just around the corner. We would like to hear from any unit, however, on your thoughts and ideas to do a better SAR job. — Ed.*

## COMM/NAV

VHF/FM (low band)	30.00 — 75.95 MHz	air-to-ground
VHF/AM	116.00 — 149.975	air-to-air for coordination with civilian aircraft
UHF/AM	225.00 — 399.95	standard air-to-air
VHF/FM (high band)	150.00 — 174.00	public safety agencies, hospitals, and civil marine
TACAN		
VOR		needed for MedEvacs and location assistance
Direction finding:		
UHF/AM	Basic equipment	
VHF/FM (low band)	Basic equipment	
VHF/FM (high band)	Open purchase	
VHF/AM	Open purchase	

(It should be noted that only authorized frequencies within a particular radio's capability should be used.)

# A lucky penny or Move over Mrs. O'Leary's cow

By LCDR B. M. McGuiness  
LT D. R. Veal  
VP-69

A One-Act Play  
Three Scenes

Winter 1977-78

Location: Hawaii

Morning

Characters: One P-3 crew (and assorted others)

## Prologue

*Everyone agrees that there are training flights and there are training flights. This was one. Everyone agrees that after weeks of snow, sleet, ice, freezing rain, and general wintertime depression that it's good for morale to log some tropic time. This had been a training flight to log some tropic time. The crew had worked hard after their arrival, but on the day of departure for home, there was no rush to be the first aboard the aircraft.*

## Scene I

18

It was the kind of morning you'd call the beginning of a normal working day. Shortly after 0700 the plane commander was aroused. He had been dreaming about hula dancers. That's enough to arouse anyone. An obnoxious buzzer sounded on his BOQ bulkhead and the pusher of buzzers believed it necessary to ring it forever. Anyone knows what that will do to your nerves. Anyway, the plane commander knew it was git-up time. He risked one eye to look at Big Ben and thought about logging an extra 40 winks, but the incessant clamor of the buzzer prevented that.

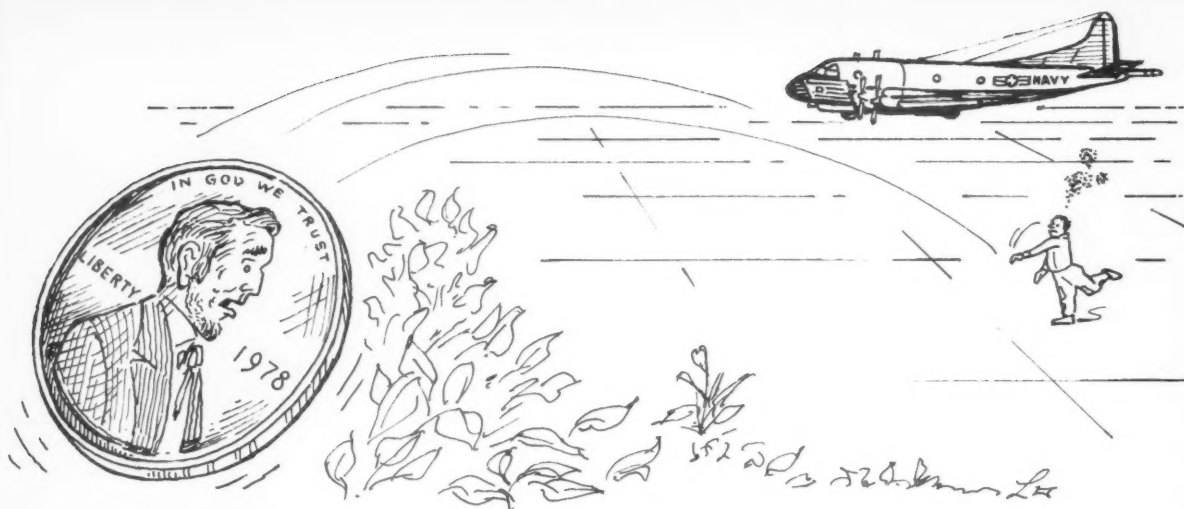
The sun was already shining brightly into his concrete room. He wondered how on earth planners and executors of plans for BOQs could possibly put together anything so drab. Outside he saw the earth was lush and clean. Heavy dew glistened on the grass and tree leaves. The palm and banana trees were rustling in the breeze. The red-topped Brazilian cardinals and myna birds sang light, trilling morning songs heralding the beginning of the visitor's last day in the tropics. The plane commander wondered if the rest of the crew hated to leave as much as he did. They did. His reverie ended with a knock on the door. His copilot's voice said, "Skip, if you're about ready we'll wait, otherwise we'll meet you at breakfast." The plane commander told the other officers to go ahead and he disappeared into the head to perform morning ablutions.

## Scene II

The plane commander slid into the seat his officers had saved for him at the table. He remarked that he wanted to savor every swallow of the fresh pineapple juice before starting on a luscious papaya. The others agreed that there was nothing like a hearty breakfast, and besides, they'd miss the tropic goodies when they got home. Between bites the plane commander said, "OK, gents, today's plan will be simple enough. We go from A [here] to C [home] with a stop at B."

After breakfast they waited on the front steps for wheels. The plane commander said aloud what everyone was thinking, "What a beautiful day!" Then he looked down and said, "Looky what I found." It was a penny which he quickly snatched up. "This is my lucky day, and this is my lucky penny." It must have been true, because a little later the agriculture inspector showed up at 1029. He was not due until 1030, and everyone knows they are never on time. The plane commander said, "What a lucky day."

Not much later the plane commander and his copilot showed up to file and stopped by the weather guesser's office for words of wisdom. There was no significant weather for 3000 miles. That just happened to be 750 miles beyond where they were going. The plane commander said, "I can't believe it's CAFB [clear as a free-ringing bell]. This is my lucky day." They returned to the aircraft, briefed the crew, conducted a thorough preflight, and the



plane commander said, "All aboard. It's time to taxi to the fuel pits, and we've still got 40 minutes before takeoff."

### Scene III

The copilot, in the left seat, said, "Number 2 is clear, start No. 2." The flight engineer commented to the plane commander, "I thought you said this was your lucky day. See that pesky generator light glowing brightly."

"Well, it started lucky. You saw the penny," replied the plane commander. The light didn't go out when the engine came on the line.

Maintenance folks came out, found the fault in the generator supervisory panel, changed panels, and the P-3 was ready again. However, the time involved had been lengthy.

The plane commander said out loud, "We'd better call Metro and get an extension."

In replying to the UHF request, Metro said, "No way, 'podnuh.' You're 10 minutes over the maximum time." The plane commander was summoned to appear in person. He mumbled about Metro's ancestry and thought to himself about 3000 miles of bright blue.

The plane commander said to the copilot and flight engineer, "It was only a penny. Gimme the secure checklist." He went through the list in record time, departed to be rebriefed (exactly the same as before). He returned 30 minutes later and grumbled, "Gimme the Before Start checklist... Now gimme the After Start checklist... Let's have the takeoff checklist."

The big *Orion* responded to 17,000 horses and quickly soared into the air. Over the ICS the plane commander said, "Set Condition IV, climb checklist complete." Without pausing for a breath he switched to Departure and reported, "Aloha."

A voice made a report on the ICS. The plane commander said, "Who? What? Whazzamatta? I don't believe it." He was told by the aft observer that the cam lock fasteners on the cowling on No. 2 engine weren't secured. (During the troubleshooting of the No. 2 generator problem, no one had secured the locks.) The plane commander, with feeling, uttered an expletive. At this point, no one in the crew had any comment to make about the lucky penny.

The aircraft reversed course and headed back. The pilot made a gentle, greased landing because of overweight. They taxied to the fuel pits for extra juice and to let the plane captain take a short walk to secure the locks. Number 2 engine was still turning in the pits when the plane commander called for Parking Brake during the Secure checklist. Suddenly a feeling of helplessness hit the pilot as a loud "thunk" was heard, and inside the cockpit all kinds of red lights flashed and barber poles illuminated. The plane commander roared, "Who raised the gear handle?"

The lights went out as the handle was returned, in less than one microsecond, to its normal position. Visions of props striking the concrete, ruptured fuel cells, and fire all flashed through the plane commander's mind. He turned white — flat, nonglossy white — and muttered, "Shades of Mrs. O'Leary's cow. This definitely is not my lucky day."

As soon as the aircraft was secured, the plane commander left his seat and rummaged through his flight suit. I'll let you in on a secret. I know the general area where there's a genuine U.S. one-cent piece — in the bushes just a coin's throw from the fuel pits.

### Epilogue

Refueling and securing the fasteners didn't take long. The next takeoff and the flight to destination were without any problems. ◀

# THE HAZARD OF HYDROPLANING

By M. P. Jones  
Specialist, Airfield Pavements and Soils  
Naval Facilities Engineering Command  
Alexandria, VA

AN official Navy aircraft report described the following landing of an F-4 at an east coast air station. Visibility was low, and there were heavy rain showers in the vicinity. The runway had standing water.

"The aircraft landed abeam the lens, hydroplaned, and departed the right side of the runway. The nose landing gear and one mainmount collapsed when the aircraft departed the runway in a skid."

This unfortunate accident was only one of many described in a computerized listing of wet runway related accidents provided to the NAVFAC (Naval Facilities Engineering Command) by the Naval Safety Center. When

all the data on hydroplaning incidents during a 7-year period were studied and tabulated, it was apparent that aircraft hydroplaning has been — and still is — a significant problem on Navy runways. During this 7-year period, a total of 72 mishaps occurred, resulting in 5 fatalities and 7 major injuries. Additionally, 4 aircraft were completely destroyed and another 42 were damaged to a lesser extent.

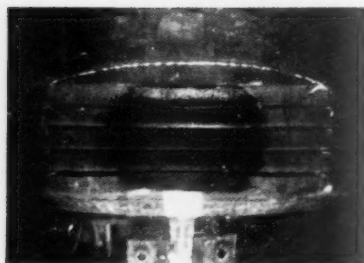
So what is hydroplaning? What can be done to minimize its hazards? Hydroplaning is that phenomenon that occurs when a tire loses contact with the pavement surface due to the buildup of water pressure in the tire-ground contact area. Research conducted by NASA in the 1950s and 1960s

The tire loses contact with the surface as its speed increases. Although these are photographs of an automobile tire, the same principle applies to aircraft tires.

4-GROOVE TREAD  
WHEEL LOAD = 835 LBS.

6° YAW ANGLE  
TIRE PRESSURE = 27 PSI

WATER DEPTH = 0.04 IN.



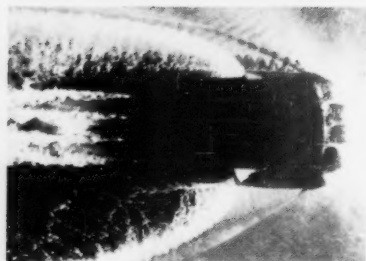
STATIC



22.8 MPH



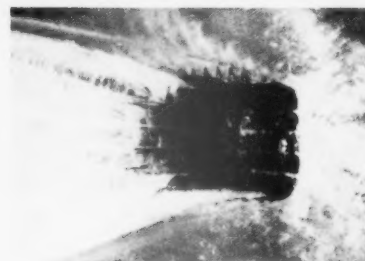
40.7 MPH



41.4 MPH



62.6 MPH



87.8 MPH

led to the identification of three forms of hydroplaning: dynamic, viscous, and reverted rubber. At present, the many factors that can contribute to hydroplaning as well as the relationship of the three forms is not completely understood, but some factors have been clearly identified.

The potential for hydroplaning is known to be a function of aircraft speed, water depth, pavement texture, and tire inflation pressure and tread design. Let's take a look at the various types of hydroplaning.

Dynamic hydroplaning was identified by NASA researchers in the late 1950s. They found that a freely rolling tire on a flooded surface would cease rotation and spin down to a complete stop at some particular speed. The buildup of hydrodynamic pressure at the tire-pavement interface created an upward force which effectively lifted the tire off the surface. When complete separation of tire and pavement occurs, the condition is called total dynamic hydroplaning, and complete loss of control can occur. The approximate speed at which total dynamic hydroplaning occurs is given by the expression:

$$V_c = 9 \sqrt{p}$$

$V_c$  = critical hydroplaning speed, knots

$p$  = tire inflation pressure, psi

Thus, aircraft having low tire pressure are more susceptible to dynamic hydroplaning than those having high pressures. Some typical shorebased tire pressures (mainmount) are as follows:

F-4 300 psi

A-7 210 psi

A-4 320 psi

Total dynamic hydroplaning happens infrequently except where the most severe rain showers exist. This is because some minimum depth of water must exist on the pavement to support the dynamic hydroplaning condition. Water depth can be extremely variable along the length of a runway but is highly dependent on rainfall intensity and runway cross slope. A highly intense rainfall on a runway having low cross slope will pool water to a significant depth and create suitable conditions for hydroplaning.

Continued

Hydroplane testing by NASA revealed much information about this dangerous phenomenon.



Crosswinds can also play a significant role in that wind gusts tend to hold water near the crown and impede water runoff.

No minimum value of water depth can be cited as promoting dynamic hydroplaning under all conditions. A relatively smooth runway surface with fine texture will induce a hydroplaning condition with lower water depths than will a coarse-textured runway. Likewise, a smooth-tread tire is a more likely candidate for hydroplaning than a new-ribbed tire.

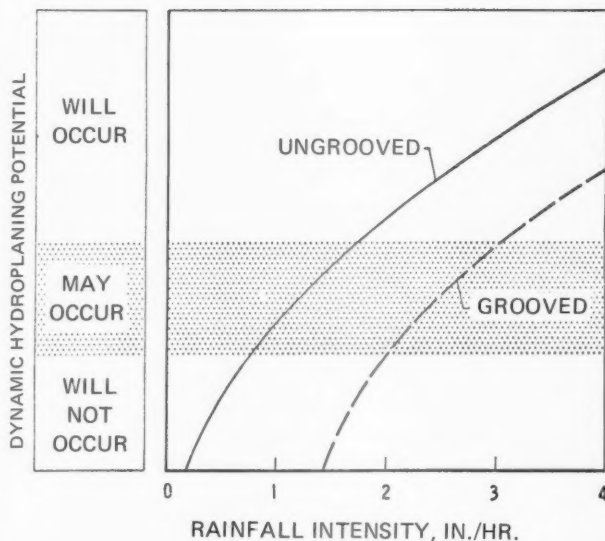
Various research efforts have not identified any one single water depth as being critical. It has been conservatively estimated, however, that for an "average" runway, water depths in excess of 0.1 inches may induce full hydroplaning of an aircraft.

Since dynamic hydroplaning requires considerable water depth on the runway, the next type of hydroplaning — viscous hydroplaning — is more common. Viscous hydroplaning may occur at lower speeds and at lesser water depths than dynamic hydroplaning. Viscous hydroplaning occurs due to the lubrication of the pavement surface from a thin film of water. The aircraft tire is unable to fully penetrate this film, and contact with the pavement is partially lost.

There has been little quantification of the many factors related to viscous hydroplaning potential. However, the tire-pavement conditions which will induce this form of skid are more likely to be present than the deeper water requirement of dynamic hydroplaning. On relatively smooth runway pavements or where runway rubber buildup is prevalent, the presence of a thin-water film can markedly reduce the effective friction coefficient, even at very low speeds. The factors most significantly related to viscous hydroplaning are pavement texture and tire tread. Water depth is of lesser importance.

Runway approach ends covered with rubber from repeated landings probably represent the greatest hazard to landing aircraft on wet runways. Measurements of friction coefficients on rubber-coated runways have in most cases confirmed that a very high potential for viscous hydroplaning exists. Data published by the Air Force indicated that measured friction coefficients on runway ends averaged nearly 25 percent lower than in the middle. When correlated with aircraft braking response, the rubber-coated ends were ranked in the marginal to fair category.

Aircraft braking response is significantly improved by tire tread on both wet and flooded runways. This is particularly important on a thin-water film, but it plays a lesser role as the critical dynamic hydroplaning velocity is approached on a flooded runway. Good tire tread design and low tire wear reduces the potential for viscous



A comparison of grooved and ungrooved runway resistance to hydroplaning.



Reverted rubber from skidding on ice.

hydroplaning. It can also serve to require an increase of the speed and the depth of water at which dynamic hydroplaning will occur.

The third type of hydroplaning is called reverted rubber skid hydroplaning. The occurrence of reverted rubber skidding or hydroplaning is detectable by the presence of white streaks on the runway. Examination of the aircraft tire usually shows an elliptically-shaped tacky or molten rubber condition. It has been theorized that this condition develops from the generation of heat during a locked wheel skid. In effect, the tire rubber reverts to the molten or unvulcanized state; thus the derivation of the term "reverted rubber."

Reverted rubber skidding can occur at ground speeds as low as 10 or 20 knots. Heat produced by a locked-wheel-skid over a wet runway generates steam which tends to lift a tire from the pavement in a manner similar to the total dynamic hydroplaning condition. The white streaks produced on the pavement are likely to be the results of a "steam cleaning." It is interesting to note that such white streaks have been observed at one naval air station known to have had a history of hydroplaning incidents.

It is important to note that in the NASA tests, the reverted rubber skid could be produced only with a locked wheel condition on a wet runway. Thus, it is generally believed that on wet runways, hard braking and wheel lock is more apt to produce the reverted rubber skid than to stop the aircraft. NASA also found that pavement surface texture has little effect on the reverted rubber condition and that such skids can occur on coarse as well as fine-textured pavements.

In summary, of the three commonly defined forms of hydroplaning, aircraft accident investigations and reports

indicate that reverted rubber may be the most frequent. To prevent such a skid from occurring, a locked wheel condition must be avoided. Therefore, in any landing on a wet runway, deceleration must be accomplished by aerodynamic drag techniques such as aerodynamic braking, drag chutes, spoilers, or reverse thrust. If the aircraft is so equipped, the antiskid system should prevent the reverted rubber skid. When braking does become necessary and antiskid is not available, many aircraft NATOPS manuals recommend a pumping technique rather than steady pressure.

A textured runway surface is the single most effective means of combating viscous hydroplaning. Although transverse grooves in the runway pavement may increase tire wear, they will provide water escape channels and minimize the probability of the dynamic hydroplaning condition. Rubber deposits greatly reduce pavement texture in the touchdown zones and therefore represent an extreme hazard to the landing aircraft. Frequent removal of rubber using high-pressure water blasting or chemical solvents is mandatory to maintaining a safe runway surfacing.

The Naval Facilities Engineering Command has been assisting in the identification of runway pavements which may have low resistance to hydroplaning. Under NAVFAC's Runway Friction Measurement Program, all active Navy and Marine Corps runways are being surveyed on a 3-year cycle to determine hydroplaning potential. Results of these surveys, with recommendations, are forwarded to both the Operations and the Public Works personnel. It is hoped that with this program, and through increased awareness on the part of the naval aviator, a continuing reduction in the number of hydroplaning incidents will be realized.



By LCDR G. H. Law  
LCDR R. L. Marquis  
LT C. J. Nechvatal  
VA-174

# The safety baseline

24



EVERY squadron commanding officer wants to believe that his pilots are flying the safest, most capable aircraft in the fleet. But occasionally, an incident occurs which may raise doubts about the quality of maintenance performed on those aircraft.

Recently our squadron received a safety message from a depot level maintenance facility concerning an aircraft which was inducted into overhaul. The rework facility's Quality Assurance personnel discovered a nut and cotter pin missing from two bolts which were critical to the operation of the flight controls. The CO's first remarks to the Maintenance Officer were, "How many aircraft do we have with similar, or even worse problems?"

Before answering that question, a brief survey of VA-174's aircraft inventory might shed more light on the problem. The command functions in a similar manner to the old FASRON concept (Fleet Air Support Squadron, for you younger gents). Our aircraft inventory is seldom stable and usually fluctuates between the lower forties and upper sixties.

This command is continuously accepting aircraft from the factory, the rework facility, and fleet squadrons. Additionally, this squadron is the repository for shore-based aircraft of deployed Fleet squadrons. Placing the problem in the proper perspective, last fall VA-174 transferred or received 56 aircraft within a 3-month period. Such a fluid inventory presents a span-of-control problem in the grandest sense of the word.

Given the size of the aircraft inventory and its constantly changing nature, downing all squadron aircraft to inspect the safety of flight areas would have shut down the organization for at least a month. In view of the operational commitments, manpower availability, and limited hangar space, totally securing flight operations to inspect every aircraft could have created, rather than prevented, further safety of flight discrepancies. Recognizing this, the commanding officer directed the establishment and implementation of a safety inspection, termed "Safety Baseline." The Safety Baseline inspection is devoted strictly to detecting safety of flight discrepancies.

The Baseline inspection was to be accomplished first on a random sampling of aircraft, and then on a routine basis for all the aircraft in the custody of VA-174. This command elected to conduct the inspection during the Phase "A" maintenance inspection, because this is when the most panels are removed. The Safety Baseline portion consists of a panel removal team detaching additional panels followed by Quality Assurance representatives scrutinizing all exposed safety of flight areas of the powerplant, flight controls, and egress/environmental systems. This allows in-house feedback to provide insight into any improper maintenance procedures.



The Safety Baseline Inspection has, to date, been performed on 13 aircraft with the following discrepancies:

Discrepancies	Total Occurrences
Improper safety wiring	48
Improper bolt installation (80% in flight control area)	48
FOD (cockpit and other areas) (95% in flight control area)	44
Improper installation of cotter pins (95% in flight control area)	35
Improper clamp installation	18
Chafing (hydraulic, fuel, and air lines)	17
Ejection seat (major, safety of flight)	3
Improper component installation	1

In addition to the above, numerous corrosion discrepancies were discovered.

Whether or not any or all of the above discrepancies would have caused an accident is conjecture; however, given the nature and number discovered, it was felt that the immediate dissemination of the information was paramount. The message traffic was prepared and telephone calls were initiated to other commands concerned. There have now been numerous cross-training sessions with local Fleet squadron maintenance departments to apprise them

of the problems discovered.

This program has proven extremely successful thus far, but now the question arises as to its applicability to the overall Navy maintenance program. There is a whole list of reasons for not submitting aircraft to such a program: time availability, operational commitments, maintenance man-hours available/required, and numerous others. However, a unique feature of the Safety Baseline Program is that, unlike Phase maintenance, which is designed to provide routine inspection and lubrication, the Baseline is designed strictly for detecting safety of flight discrepancies in the critical safety areas. Not only does this provide excellent training for all concerned, but weaknesses within a maintenance department can be isolated if specific problem areas recur on the second Baseline inspection. So, while there may be numerous reasons for not performing the Safety Baseline inspection, there is one major justification for its implementation — **FLIGHT SAFETY!**

*The Safety Baseline concept is certainly not limited to the A-7 community. Any command interested in more information on the program may call LCDR Marquis, the QA Officer, or LCDR Law, the Maintenance Officer at VA-174. The Autovon number is 860-6104. — Ed.* ◀

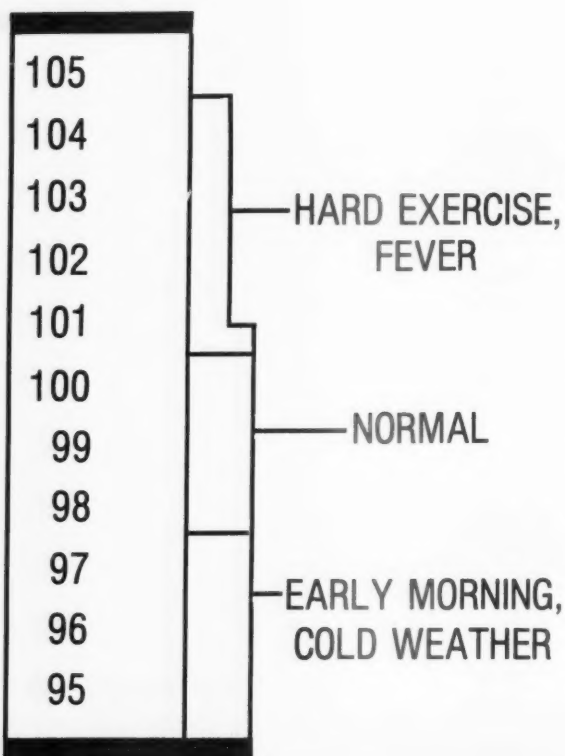
# Boy, is it hot!

By LT George Banta, MSC  
NAS Meridian



SUMMER is upon us again. Are you going to become a member of the HHH club this summer? That's not the Hubert H. Humphrey Fan Club, but heat cramps, heat exhaustion, and heat stroke. We all look forward to the warm weather, but we should all beware of the heat illnesses.

Humans are called homoiotherms – "warmblooded." The core temperature tries to remain basically constant. This constancy has normal ranges as indicated below:



If we were to divide the body into two temperature zones, they would be the core (around the internal organs) and the peripheral (skin). It is important to maintain our core temperature near 98.6°F. (Usually in babies we see a slightly higher temperature.)

If the external environment is extremely cold, we must stop our heat loss to the outside. When the environment is extremely hot, we must give off some body heat to maintain our normality. We do this by:

**Convection.** Heat is removed from the skin surface by air currents (fan).

**Conduction.** Heat is conducted to the air next to the body surface by being in direct contact. Air is very poor compared to water. Water is the best heat conductor. We seldom feel hot in a nice cool swimming pool.

**Radiation:** Like a radiator in an old house, if the environment is less than 98.6, heat is radiated off. However, if the environment is higher than 98.6, the body absorbs the heat.

**Evaporation:** The most common known. Sweat (water) on the skin surface is heated by the skin and evaporates, thus removing the heat of vaporization. This is the most effective means in the summer and is the only means of losing heat when the outside temperature is greater than 98.6°F.

The regulatory center within one's body (or the thermostat, if you wish) is an area of the brain called the hypothalamus. When the hypothalamus is stimulated by: 1) temperature of the blood from the core; 2) adrenalin (an excitatory hormone in the body; this is why we sweat when we get very excited or emotional; 3) direct nerve impulse; 4) heat receptors in the skin, a chain reaction occurs, causing:

- Stimulation of sweat glands.
- Dilation of blood vessels in order to carry more warm blood to the skin area (this is why we get red in the face).
- Stimulation of the glands to produce hormones to help retain salt.

When the normal system is overstressed by exertion, wearing improper clothing, or spending too much time out in the heat, we find that our bodies are unable to retain enough water and salt. This causes an electrolyte imbalance and a decrease in blood volume which can result in cramps, dizziness, headaches, exhaustion, emotional instability, and shock.

Heat illnesses or the HHH are:

**Heat cramps:** Cramps from excessive salt loss most often strike physically fit persons who overexercise in hot, humid weather. The cramps usually strike in the abdomen, arms, and leg muscles, and are usually severe. The individual normally becomes weak, nauseous, and his skin is pale, cool, and moist.

The key to treating *heat cramps* is replacing the salt – but not directly. Get the individual to a shady, cool location and give him a salty liquid (one teaspoon of salt in a quart of water or lemonade is effective; or such a thing as *Gatorade*, which has salt in it). There is no need to massage the muscles. Salt replenishment is the only answer. Anyone who has heat cramps should rest for at least 12 hours and seek medical advice.

**Heat exhaustion and heat stroke.** There is a crucial difference between heat exhaustion and heat stroke. They both require attention, but heat exhaustion is not usually as life-threatening as heat stroke, which requires immediate action. In both cases, symptoms begin with fatigue, weakness, dizziness, headache, and disorientation. The most noticeable distinction is skin quality and temperature. As seen with cramps, in heat exhaustion the skin is quite pale, cool, and moist (clammy), and the body temperature is normal or slightly below normal. In heat stroke it is the reverse – the skin is flushed, dry, and fiery hot. The body temperature may be as high as 106°F or more. The individual will die within a very short time with heat stroke unless treated immediately.

Treatment for heat exhaustion is much the same as for heat cramps. The victim should be moved to a cool spot and given a salty liquid to drink. Remove most of his clothing and cool by fanning or wiping off with cool water.

With heat stroke, minutes count! Strip off the person's clothes and begin cooling with whatever means available. Immersion in a cool bath or a massage with ice is ideal. The person should be rushed to the hospital as soon as possible. Salt loss is not as important in heat stroke. If the temperature begins to drop, cover the victim to prevent shivering.

**How to prevent HHH in hot weather.** Avoiding any exposure to above normal heat is not necessary to prevent heat illness. In fact, with increasing exposure to a hot environment each day, week, and month, one becomes somewhat acclimated. However, it is of great importance to pay special attention to common sense procedures.

- Wear light colored, loose fitting clothing so that sun rays will be reflected, thus providing for less heat absorption and better sweat evaporation.

- Drink fluids often to replace your water loss. Salt your food liberally at meals. Many years ago it was Navy policy to set out salt tablet dispensers in hot working spaces or for safety officers to give out salt pills. We have found, unfortunately the hard way, that this leads to too much salt and causes equal, if not worse, problems. Salt dispensers should no longer be found in working spaces. If one's salt content must be increased above what the salt shaker can provide at the dinner table, it should be ordered by the Medical Department.

- Acclimate yourself by limiting your exposure to the hot weather or strenuous activity in a hot environment to 1 hour (or less if you are out of shape) on the first day, adding 15-30 minutes each day over a week or 10 days.

- Avoid exercising outdoors during the hottest hours of the day. Wearing a sweat suit is *dangerous*, and wearing a rubberized sweat suit in order to make you sweat because you think you will lose more weight is a *crime*. You want your sweat to evaporate to lose heat, not pour off the needed salt content. If you are exercising – like jogging – in the heat, usually a pair of shorts, t-shirt, shoes, and socks is proper attire.

- Be aware of the days when the humidity is high during a heat wave. When the humidity gets much above 60 percent, the air won't absorb as much sweat as necessary.

- If you are on low-salt diets, or have a chronic disease – hypertension, heart disorders, respiratory disorders, etc. – consult your physician before engaging in unusual activity.

- Get medical assistance as soon as possible if you feel any of the symptoms previously mentioned while working or playing in a heated environment.

For further information, see NAVMED P-5052-5, "The Etiology, Prevention, Diagnosis, and Treatment of Adverse Effects of Heat." Also, a 27-minute training film, "The Heat Stress Monster," MN-11631 (1977), provides an overview of heat stress, its physiological effects, and how to control it. – Ed.

ACLS Excitement: Equipment Malfunction —

# *Not* controller error

28

Washington, DC — Having the overall management/coordination responsibility for the ACLS (Automatic Carrier Landing System), this command would like to clarify the events culminating in the incident described in the "Air Breaks" feature of the MAR '78 APPROACH.

The pilot's reaction in an *extremis* situation was truly admirable. However, the analysis of the causes of the incident and recommendations for corrective action were based on limited information.

In the subject incident, a "large" pitch command would not have been generated by the ground portion of the ACLS unless the aircraft was at an altitude which deviated significantly from the prescribed level leg altitude. The engagement or disengagement of the coupler has no effect on the magnitude of the pitch commands sent to the aircraft. Only the aircraft's deviation from the appropriate altitude, sink rate, aircraft type, and range determine the magnitude of the pitch command sent to the aircraft.

All ACLS aircraft types have effective pitch command limiting. This limiting is accomplished in one of two ways. In the case of the A-7, command limiting is by the basic airframe's long time constant (slow) response to ACLS

Reprinted from March 1978 *Approach*



**ACLS Excitement.** An F-4J almost went out of control when it experienced a severe nose pitchup after the pilot engaged the coupler for a Mode I Automatic Carrier Landing Systems approach. Only prompt corrective action by the pilot prevented the aircraft from stalling and departing. Postflight investigation revealed that no malfunctions existed in either the aircraft or the ground ACLS equipment. What was discovered was a very dangerous procedural error by the ACLS

commands and requires no pitch command limiter in the aircraft. In the case of the F-4's rapid (short time constant) response to pitch commands, a pitch command limiter is installed in the aircraft to prevent ACLS commands from putting the aircraft in *extremis*. An F-4 with a properly functioning autopilot coupler, receiving the maximum possible ACLS commands, may result in a "ride" which is disconcerting to the pilot, but it will not result in the immediate uncontrollable situation described in the subject article.

At the request of this command, the autopilot coupler from the aircraft involved was evaluated by the Naval Air Test Center. The subject autopilot coupler had a defective amplifier network Z5 in its coupler pitch module. The failure mode demonstrated by this network resulted in a coupler output equivalent to a maximum nose-up stabilator deflection. This maximum nose-up stabilator deflection was induced by a failure in the autopilot coupler downstream of the pitch command limiter and would have occurred whenever the coupler switch was engaged, with or without received ACLS commands.

In summary, while it is obviously preferable to design an aircraft so that there is no possibility of an uncommanded

control deflection, it is very difficult and expensive — in terms of both money and performance — to completely eliminate all possibility of this type of occurrence. The location of control surface command limiters in the control system must be balanced against the probability of failure of the components downstream of the limiter. Therefore, in light of the above and lacking a significant number of similar reported occurrences, no further uncommanded control surface deflection limiters appear to be justified.

While the action of the ACLS final approach controller in this incident could have possibly resulted in a disconcerting ride for the pilot, it in no way was responsible for the extreme pitchup encountered.

The disturbing portion of the incident and subsequent investigation is that the autopilot and coupler were tested by the AIMD (Aircraft Intermediate Maintenance Department) and returned to the squadron RFI (ready for issue). The defective amplifier network which caused the incident was not discovered until the autopilot and coupler were tested at NATC.

This command's point of contact for ACLS matters is LT S. E. Modlin, ACLS Project Officer, AIR-53355A, Autovon 222-0751.

O. E. Hall  
Naval Air Systems Command

29

controller that can get the unwary F-4 pilot in deep and serious trouble.

The flight was a normal training hop, and the crew had flown two successful Mode II approaches, checking out the ACLS, the automatic flight control system, and the approach power compensatory system. With everything looking good, the third approach was to be a fully coupled Mode I ACLS. After normal ACLS lock-on at 6.5 miles, the controller transmitted, "114 report coupled." However, before the pilot engaged the coupler, the control stick snapped full aft, the *Phantom* pitched noseup, reaching approximately 40-50

degrees nose high. The angle-of-attack shot up to 28 units and stabilized at 30 units as the aircraft entered wing rock. Simultaneously, the pilot disengaged ACLS and APCS, applied full forward stick, and selected afterburners. The port wing fell off about 30 degrees, and the aircraft successfully recovered.

The student controller under instruction engaged the command mode of ACLS prior to the pilot reporting coupled. In the F-4 aircraft, if the pilot then engages the coupler, the aircraft will receive a large magnitude command which has been allowed to build prior to coupling.

This is what happened.

The dangers of this situation are obvious. All F-4 aircrews and ACLS controllers should be acutely aware of this system "glitch," and the investigative board recommended that a modification be engineered to preclude further incidents of this nature. Fortunately, this mishap occurred to an experienced pilot, or the outcome might have been completely different. The pilot's prompt, positive, and professional recovery from a potentially dangerous low-altitude situation averted an accident. Nice job, CDR! Bud Lineberger! ◀



# Letters

## Night Carrier Landing Accidents

*NAS North Island* – On a recent Mediterranean deployment, I had the unpleasant opportunity to witness the loss of two fellow aviators in a night barricade penetration/ejection accident. The postejection events pointed out three weaknesses in our SAR efforts: accurate datum fixing, illumination of the crash site, and postejection survivability.

A solution to the first two weaknesses lies in getting enough bright lights into the water as close to the impact area as possible. The most apparent need for maximum illumination of the impact area is that, with current markers, a helo or whaleboat crew spends an inordinate amount of time locating the *light* – not looking for the survivors. The technology surely exists to produce a raft released by primary or the LSO which has large, sealed lights for illumination, a sea anchor to reduce drift away from datum, and sufficient reflectivity to assist daytime datum location. The raft should have self-righting ballast and at least three lights placed far enough apart to give the SAR helo pilot a horizon reference. Placing the raft in the forward-most liferaft container on the angle would allow adequate displacement from the wake, close proximity to the usual impact point, and easy access for PMS.

Ejection at low altitudes, particularly at night, is apparently almost nonsurvivable around the ship. The trend of low ejection, parachute entanglement, no LPA inflation, and drowning points to one glaring need: there has to be a way to automatically

provide flotation until the aircrewman becomes conscious enough to think through the mechanics of getting rid of his chute. Automatic LPA inflation during the chute-opening sequence – regardless of altitude – is preferable to thrashing around in the ocean trying to find those toggles.

The suggestions submitted are in the interest of kicking in another two cents on what is perennially a high priority item. We all try to keep it in the middle, but it's good to know someone's looking out for those who don't.

LT Robert J. Coolbaugh  
VS-41

● The high risk potential faced by aircrew having to eject during carrier operations continues to be a matter of concern. In response to the increasing need to provide the aircrewman ejecting under these circumstances with every available means of survival, the development of automatic actuation devices for LPA inflation and parachute divestment is progressing. While this program has been on-going for several years, Fleet introduction of these devices is anticipated within 12 to 14 months for the LPA actuator device, and 18 to 20 months for the automatic parachute divestment device.

The feasibility of a lighted raft as a means of survivor locator has been discussed by the Naval Safety Center Life Support Equipment Branch with cognizant personnel at the Naval Air Development Center, Warminster, PA. As a result, Naval Air Development Center is interested in pursuing your recommendations for the

purpose of defining the need for such a liferaft, and investigating the feasibility and possible development of such equipment that would provide additional locator assistance in similar circumstances.

Your recommendations will therefore be forwarded to that activity for further study. Your interest in the furtherance of Aviation Safety is appreciated.

## Double Knits and Transports

*Washington, DC* – Concerning CDR Keyes' letter (MAY '78 APPROACH) about synthetic sweaters under Nomex flight suits as a safety problem, what about the 100 percent polyester flight suits worn by C-9, -131, -118, T-39, and other transport drivers? This hazard goes unchecked and even encouraged because "they look sharp and you don't want to alarm the passengers with a Nomex flight suit." I feel it is definitely not the way to go.

OPNAVINST 3710.7H deletes the requirement for a fire-resistant flight suit for crewmembers in cargo/transport flight not involving carrier operations. But why? The threat of fire still exists in land-based operations. If a transport aircraft did have a fire either on the deck or in the air, why put a crewmember, whose duty it is to fight a fire or evacuate passengers, in further jeopardy by *requiring* him to wear a synthetic flight suit. It does not make sense. If the technology exists to make fire-resistant flight clothing, then it should be used to the fullest advantage. If a special flight suit is desired for transport or

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administrative flights, then it should be made out of fire-resistant material. We owe it to our aircrew and the passengers we fly to have the best. Leave the blue polyester jump suit home to cut the grass in.

LT Thomas M. Feeks  
NAF Washington

● See next letter.

## Fire Protection and Appearance

Washington, DC — CDR James L. Keyes' letter in the MAY '78 APPROACH on "The Case for Cotton" is heartily endorsed with some additional comments offered.

For those fancy duns who insist on looking sharp in their flight suits but who want to be reasonably protected, the all-cotton turtleneck flight deck identification jersey is recommended as a more suitable alternative to the flame-hazardous synthetic sweaters.

The quest for improving the military appearance and aesthetics of flight clothing has for recent years taken on added emphasis and importance by both Fleet operators and we here at NAVAIR, responsible for aircrew equipment. It is not always possible to combine the sharp-looking casual appearance with a functional military garment, which meets all safety requirements. One example where this may be accomplished, however, is the development of a new knitted 100 percent aramid (Nomex) flight suit designed by NAVAIRDEVEN, Warminster, which is scheduled for OPEVAL late this summer. Prototypes previously evaluated have indicated the new knit suit will increase the fire protection and at the same time provide a substantial improvement in comfort, fit, and appearance.

Lionel Weinstock  
Crew Systems Division  
Naval Air Systems Command

## Wants Safety Ribbon

South Weymouth, MA — Throughout the Navy, tremendous emphasis is placed on safety programs and safety awareness. Annually, the best units are awarded the CNO Safety Award. An award as prestigious as this should be represented by a ribbon in the same category as the Good Conduct, Marksmanship, and Unit Commendation ribbons. The ribbon would follow the man throughout his naval career and would show his part in the overall effort that contributed to his unit's winning the award.

To win the CNO Safety Award is a high

honor, and the competition is very keen among the units in contention. The added incentive of a CNO Safety Award Ribbon, as well as the "S," would add to the competition and the prestige of winning. It would also probably increase the all-hands safety effort.

Therefore, we hereby propose that a unit award be established with a ribbon of solid emerald green representing safety. It would be a ribbon that the individuals can wear with obvious pride.

AE1 K. C. Owings, USNR  
AE1 A. M. Vacious, USNR  
VP-92 Safety Petty Officers

## Re "Not Knowing Your Pilots"

FPO, New York — I read with interest the article "Not Knowing Your Pilots" in the APR '78 issue of APPROACH. What came to mind as I read and discussed the article with several aviators, with regard to letting persons in charge know of dangerous pilots within their commands, was an incident that took place not long ago.

The significance of the incident is small when compared to those actions that followed and the end result of one conscientious copilot's efforts to maintain professionalism in Marine Aviation.

While on a fam training hop, the CH-53 instructor HAC decided to do some low-level acrobatics over his house. His copilot was fresh from flight school but had considerable crop-dusting experience in fixed-wing aircraft prior to entering the military.

After returning from the flight, the copilot reported the HAC's home acrobatic show to the squadron safety officer. The safety officer did his job and the HAC was given a flight board and eventually transferred.

What happened next was perhaps the more significant of events. The copilot finished unit training and was sent to a squadron.

Upon arrival the new copilot was in for some surprises. Welcome aboard? Hardly. It just so happened that the HAC had been a good "ole" boy in this very squadron prior to becoming an instructor. The new copilot was immediately ostracized. HACs refused to fly with him. He was taunted and the command transferred him to WESTPAC when the first opportunity came.

I am a copilot and have respect for those who have earned their HAC papers. However, when a HAC exercises poor judgment in flying while I am in the aircraft, my life is on the line just as much as his.

Therefore, I believe that I am just as responsible for the HAC's actions as he is for mine. Those who feel otherwise and feel that copilots should cover for a HAC's headwork problems have no place in aviation or command.

Name Withheld

● Despite the ostracizing, the copilot did right. Who knows, if he hadn't blown the whistle, the instructor HAC and whoever was with him might be dead, and the Marines might have one less CH-53.

## Thunderstorms

FPO, San Francisco — The lead article in the JUN '78 APPROACH reminded me rather vividly of a hairy flight we had in a P-3C. We were on an overwater flight and our weather briefing indicated a frontal system, oriented east-west, across our northbound track.

The weather guessers forecast no frontal icing or turbulence other than associated with the thunderstorms.

We made an en route stop and took off on the second leg. We were cruising at FL220 in VMC and began to see the front in the distance. It didn't look too bad and our radar showed only a few thin spots. However, the closer we got to the front, the more improbable it looked that we'd be able to deviate.

We had 20 souls onboard, so the aircraft commander set Condition Five (ditching stations). After a short chat with ATC, we were cleared for a 40-mile deviation to the east in order to crack the front in a weak area.

We entered IMC at 220 knots, traveling between cells, when ZAP, we were struck by lightning on the lower port side of the nose. The port aft observer saw a bright flash and a static discharge. We lost one UHF, both VHF transmitters, and the marker beacon light illuminated. We were in light to moderate turbulence (with one instance of severe turbulence), heavy rain, light hail, and moderate rime ice.

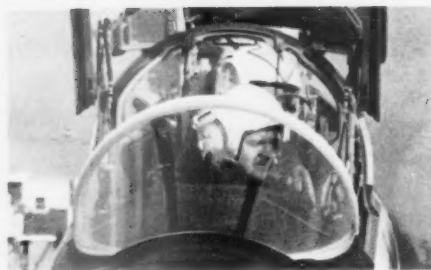
Penetration only took 2 minutes, and after ensuring we were still glued together, we continued uneventfully to our destination. Oh, yes, the radios came back on the line and worked OK.

There's no doubt it was a hairy 2 minutes, but I'd hate to think what we might have been subjected to if it had been night, if our radar had gone sour, and if we had not been in a weak area.

Name Withheld

● You "gotta" believe ALL thunderstorms are hazardous!

# approach



Pg. 1

- 1 A Special Safety Program for Special Safety Problems  
By Richard P. Shipman
- 5 The "Routine" Carrier Launch  
By LCDR Paul Statskey
- 8 Well Done! LT John Dailey
- 9 Delta Pattern Blues  
By LCDR Ron Hartinger
- 10 The Accident Was Caused by . . .  
Squadron Error
- 14 Cleared for the Approach  
By LTJG Jim Carman
- 15 Oops, Slips!
- 16 SAR CONUS  
By LCDR Dale Haan
- 18 A Lucky Penny or Move Over  
Mrs. O'Leary's Cow  
By LCDR B. M. McGuiness and LT D. R. Veal
- 20 The Hazard of Hydroplaning  
By M. P. Jones
- 24 The Safety Baseline  
By LCDR G. H. Law, LCDR R. L. Marquis,  
and LT C. J. Nechvatal



Pg. 16



Pg. 20

- 26 Boy, Is It Hot!  
By LT George Banta

## DEPARTMENTS

- 6 Air Breaks
- 12 Bravo Zulu
- 28 Our Readers Respond
- 30 Letters



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CREDITS/Staff artist Blake Rader designed this month's cover symbolizing the P-3 Orion as part of Naval Aviation's role in the defense of America's freedoms. The Orion conducts antisubmarine warfare operations over many of the world's seaways. IFC-4 Photos courtesy the Naval Test Pilot School; Pg. 16-17 Photos courtesy the author; Pg. 20-22 Photos courtesy the author; Pg. 24-25 Photos courtesy SN J. B. Wilson.

# THE BIG PICTURE

By RADM H. P. Glindeman, Jr.  
Commander, Naval Safety Center

AS the Commander of the Naval Safety Center, I am in a unique position to see all the mishap reports that come in from the entire Navy. As you can well imagine, this is sometimes a very frustrating experience. It is discouraging to learn of the many accidents that occur that were entirely preventable if only a little prior thought and good judgment had been exercised.

Most of us in aviation keep a good handle on our major aircraft accident rate. What most of us don't know is that we have a lot of other accidents that cause damage or injure personnel. Therefore, I would like to give you a feel for the total accident picture in Naval aviation. The Navy/Marine Corps currently own and operate about 4600 aircraft. In calendar year 1977, there were a *total* of 2358 aviation mishaps, both in the air and on the ground, that *resulted in damage and/or injury*. In addition, there were nearly 13,000 incident reports that came to the Safety Center that did not result in damage or injury, but were close calls of one kind or another. The grand total for the cost of all this damage comes to 363.0 million, with a loss of 118 lives. The major accident rate per 10,000 flying hours ended up at .68.

How are we doing so far in 1978? Not very well, although after a disastrous first quarter, the trend for the last couple of months is encouraging. Due to the dynamic nature of the data, my best figures for this year only go through April 30. As of that date, 764 mishaps had been reported that resulted in damage and/or injury, with another 4300 incidents in the "close call" category. Forty-eight lives had been lost with the dollar cost at 174.8 million. The major accident rate stood at a disappointing 1.04 on March 29 although as of May 26, when this article went to the printer, the rate was down to .80. We are still a long way from our goal of .58.

I hope you find these statistics as sobering as I do. We are operating in an era of escalating costs and limited resources, and we just cannot afford these losses. It is easy

to look back over the past 20 years at our accident rate and pat ourselves on the back for a job well done. We have made great strides in the safety area, and we could easily become complacent. But as our inventory continues to include more and more modern, highly sophisticated, very costly aircraft, our emphasis on the preservation of assets must also increase. Now is not the time to relax, but to renew and intensify our efforts towards safety.

Our data show that 85 percent of all accidents occur as a result of unsafe acts, versus 15 percent as a result of unsafe conditions. True, material failure is still a cause of many accidents, but it is becoming increasingly obvious that the key to an improved safety record in the future is the human being.

I am sure that you have heard the saying that there are no new accidents, only old accidents that happen over and over again. The problem is in educating the new men and women that come into the Navy each year on the costly lessons that have been learned over the years. We have made progress in safety in the past, but if we are to continue with this progress in the future, greater emphasis is going to be necessary on the human element. Remember, safety is an attitude reinforced through education and hazard awareness. It is the job of all of us in the Navy to educate.

	CY-77	CY-78 through April 30
Major Accident Rate	.68	.86
Fatalities	118	48
Cost	363.0 million	174.8 million
.....		
Major Accidents	134	54
Minor Accidents	58	27
Incidents that Result in Damage and/or Injury	1460	435
Ground Accidents	76	21
Ground Incidents that Result in Damage and/or Injury	630	227
	<hr/> 2358	<hr/> 764



**Safety**  
**is a word**  
**people know,**  
**but fail to**  
**remember until**  
**there is an**  
**accident.**

